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MODEL AIRPLANE NEWS

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27th Year of Publication

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M. A. N. AT WORK

by William Winter

► For the sake of MAN's friends in many foreign lands, this month's boisterous forum—can we call it learned discussion?—is launched with an explanation of two seemingly non-areonautical items. One is the movie word "gat," which is slang for a hand gun: you know, heater, rod, Roscoe. The second is a reputed Western custom of another day when the rougher frontier characters were invited to check their guns at the door. So, Sirs, that pile of scrap metal at the workshop portal is just a pile of—gats. Let's say these figurative gats are the more personal and colorful statements that have been censored from the blasts that figure in, ah, our learned discussion.

In the March issue, Don Alberts, Senior National Champion, teed off on MAN at Work's statement that free flight was in a rut. He felt that anyone who wanted to see free flight heavier (it appears that he might have better blasted the FAI!) just couldn't build light models and wanted to legislate themselves into the winner's circle at the purist's expense. This puts it mildly. If the following seems to wander, it is because it follows Don's points one by one— and we are not able, for space reasons, to review Don's arguments in full. Perhaps we should say that Don's references included Eastern "subway riders," controlline skills or lack of same, the scientific fliers, et cetera ad infinitum.

"Don evidently does not know," Parnell Schoenky, the helicopter expert, cuts loose, "that contest flying was born about 1910 (in New York, tsk, tsk), when some of the experimenters and model scientists he sneers at decided to rise above sport flying [Don said contest flying today is sport.—*Editor*] and match their models in competitions. The very essence of contest flying is achievement and the tougher the rules, the greater the achievement. There is fun in contest flying and also a lot of work and the reward is in the feeling of true accomplishment that accrues to the winner. Those who fly purely for fun and relaxation, for the thrill of the long thermal flights and the roar of the oversized engines—for "sport," that is—ought to stay in their own element and not seek to belittle contest-type wingloadings, powerloadings and other things they do not understand.

"Contest modelers have always had to contend with the easy-trophy boys, thermal (*Continued on page 6*)

NEXT MONTH'S COVER

Ike's Commander

PLANE ON THE COVER

One of the most magnificent American airplanes of all time was the Lockheed Vega, so far ahead of its time 20 years ago that it would still look modern—if one could be seen. Of all-wood, then all-metal construction, it had many variations, such as seven-seat, 450 hp P & W Wasp version, 195 mph maximum speed. Span, 41 ft.

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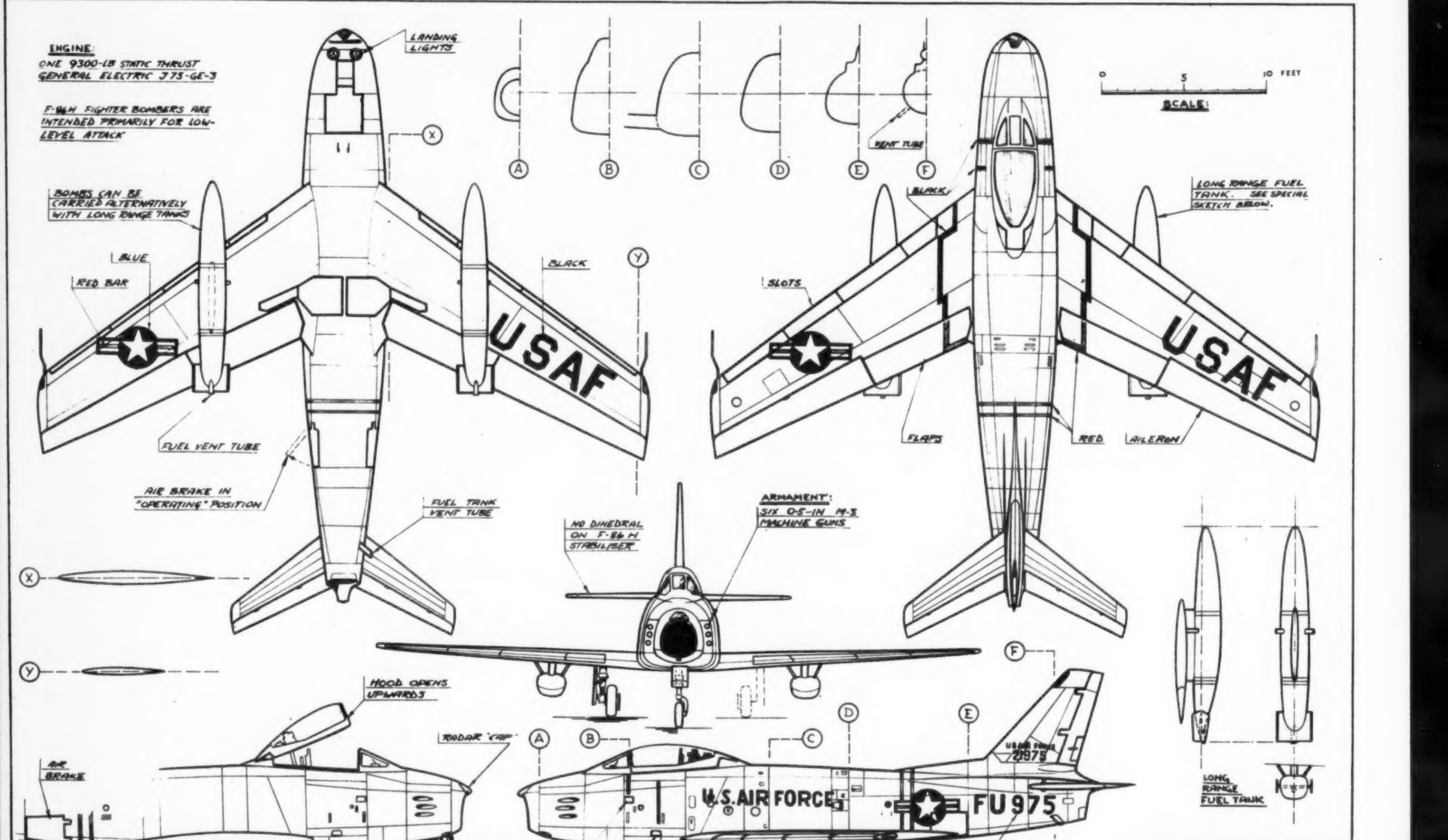

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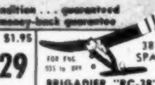

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MAN at Work

(*Continued from page 2*)

hunters, etc., who invade their ranks and cry for the sort of childish rules that give every clunk on the field a chance to hit a big riser.

"I'm just one of the many free flighters who have been voting and pleading for higher loadings for years," Schoenky declares; then asks, "What happens?

"The softies and the thrill seekers vote us down every time and free flight stays in the rut. Now, I've built them light (it is easy, Don) and I've built them heavy," Parnell goes on. "From experience I'd say this: anybody can build light junk, tie it to a glow plug skyrocket and get it a mile high, whereas it takes a real modeler to build and fly the fast, heavy jobs.

"As an example of how wild this lad was swinging when he cooked up his explanation as to why people favor higher loadings, consider George DeLaMater, one of the best modelers I've met, including Westerners, and an acknowledged expert at building ultra-light structures for Wakefield, indoor and free flight gas," Schoenky continues. "Yet he has pushed hard for higher loadings year after year to minimize lucky thermal flights. To suggest that people like him want heavy ships because they can't build light structures is ridiculous.

". . . Flubbed again with his analysis of PAA-Load," Schoenky runs on. "It so happens that these wonderful payload events are doing fine in comparison with FF gas, even though the latter is easier to build and has 15 years' head start. Actually, the PAA events attract all the best free flight men, those who scorn the vastly overpowered FF floaters and the track-meet events and concentrate on the tough categories—those that demand real skill in structures, aerodynamics, powerplants. I've seen tomato crates soaring in Texas thermals but I've never seen 'Albuquerque Al' lift 67 oz. total with a Thermal Hopper—as the PAA-Cargo boys are doing."

Now let's take a between-the-rounds rest; simmer down, shall we, boys? Oh, Parnell will be back and a few other guys, too, and not all in one corner of the prize ring, either. It would be well to bear in mind that Don's remarks two issues ago are not really his alone; they represent the views of a great many free flighters and, therefore, these arguments and barbed statements, pro and con, probably should not be read in terms of personalities. So saying, back to the fray!

"Something like 95 per cent of America's modelers do not live and fly in vast wastelands, as Mr. Alberts happens to do," states Schoenky, "so what is wrong with rules that reflect reality? Slowly but surely, people everywhere are wising up to the phonies of lucky-thermal contest victories and, as a result, they are demanding more emphasis on consistency and genuine performance criteria.

"This modeler didn't like the dirty crack about controlliners," Parnell winds up. "They have their goodly share of purely sport fliers and their occasional wind bags just as we free flighters do. But they also have their skilled craftsmen and designers, their devoted competition fliers, the equals of any free flighter. And I never knew one to win a trophy with the aid of a giant puff of air."

In this corner, gentlemen, we have Merrill Combs, qualified free flighter from Lancaster, Calif., who also hews to a line and lets the chips fall where they may.

"I am in complete agreement with Don Alberts," he begins. "Perhaps your contention that free flight is in a rut is true in the East. Out here we are well on the way to obtaining good VTO stability in all kinds of weather, windy or calm. It has long been a problem to get a really hot, fast ship off the ground at contest sites. (How about all the squawks at the FAI elims in the East last year?) Ron St. Jean showed us the way with his Ramrods. This type of thinking is not in a rut!

"I have not seen anyone come to the contests and do a flat six minutes in all types of air. When this becomes commonplace, I'll agree we need changes, and not before. Graceful curves are pretty," Merrill states without fear of contradiction, "but they are not rugged, light, or easy to repair. I believe the consistent winners fly functional designs with square corners and rugged enough to stand up under the beatings they receive from trees, wires, etc.

"I quit rubber, PAA, towline, etc.," Combs warms up, "because of the confounded rule changing. Never again! I had a good limited rubber ship that held the record for a while. A still better one was never flown at a contest because of a rule change. This airplane just can't compete with five bucks' worth of imported rubber in a Wakefield.

"You say we develop skill in adjusting and not in developing the plane? I can't see anything wrong about knowing how to get all you can out of a model," argues Combs. "I'm sure I can build a good stunt or speed ship but I sure couldn't win anything with it except maybe a prize for the biggest splat. Development of both skills is required.

"I'm a little tired of hearing the do-gooders who talk about the 'good ol' days,' saying what we need or don't need. If the old timer knows so much, why isn't he out there walking off with the lot? I think he is afraid to try to harness all the power of a hot Torp. The same goes for the characters who propose class changes as outlined in *Model Aviation*.

"And speaking of these proposals," Combs concludes, "what are we trying to do? Put all the good engine manufacturers out of business? It seems to me that a very shortsighted pressure group of Internationalists is behind this farce. If these guys can't generate enough interest in FAI, it's their own fault, seeing how they always manage to hide their confounded eliminations from any outsiders who might be interested. Maybe they like their free trips too well to make dates and places public. Besides, how can anyone but a select few afford all the trips to local, regional and national eliminations?"

In round three, let's hear from a couple of controlline men. First, Bill Netzeband, by chance from Kirkwood, Mo., Schoenky's home town, and designer of the Half Fast, top combat job in 1954 and still going strong. "Don's remarks on controlline were a slur," VTO's Netzeband, "but actually prove one point of our argument. Let's analyze what he said about development. The word development means the act of developing and to develop means to bring from a lower state to a higher state or to advance from one stage to another. So a high state of development would mean an end of improvements. Controlline rules, except for speed and combat, allow for further improvement of the airplane. Now the free flight rules, coupled with the high-rpm controlline engine (if you will note the expression!) have made a farce of competition. All that is necessary to win in FF gas is a hot engine, any old airplane, an athletic helper and some good old luck! Just look at the number

(*Continued on page 38*)

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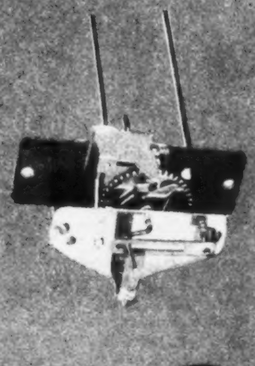

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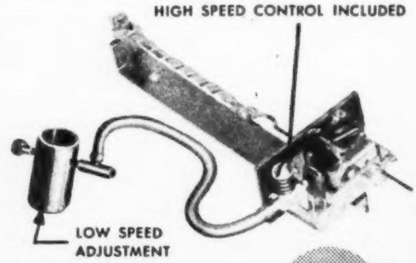

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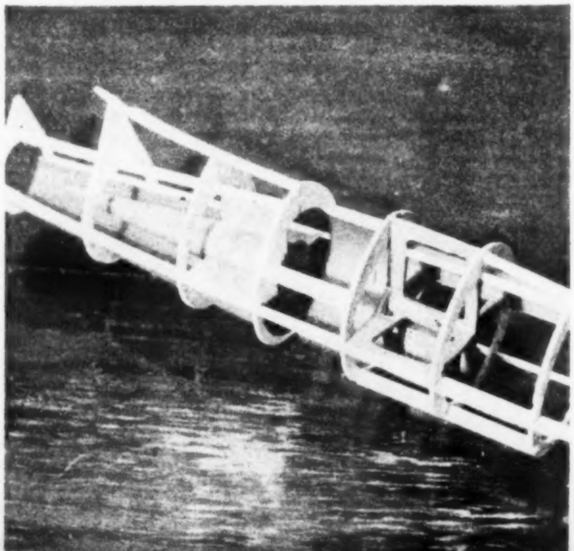
Taking off, the little Cougar looks amazingly like real Grumman. An ability to rise off ground unassisted an exception in ducted fan jobs.

Over the fence, on true fighter approach, is the model—absence of the landing gear doors proves it a model. Doors, etc., would damage easily.

Check this picture with cutaway drawing and the plan. It gives useful details on the amidships construction, tank installation, tail cone.

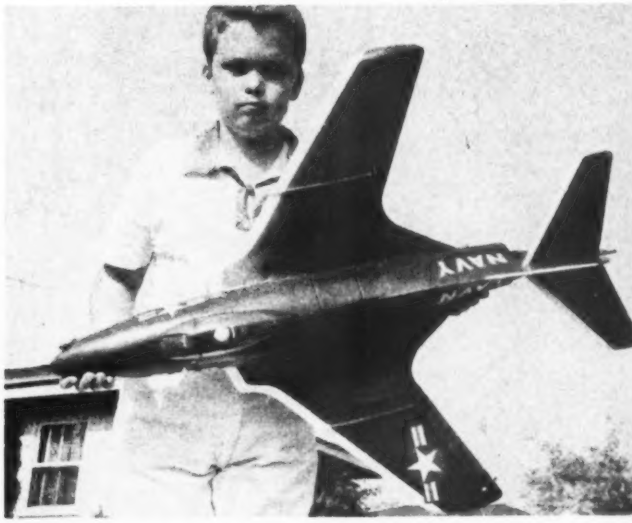


DUCTED FAN

GRUMMAN COUGAR

Realism, a good flight performance, are combined in this beautiful scale job.

Why not fly the jet!



Relative size of the flying model is indicated by nine-year-old Bill Paxton, author's son. Performance good enough to allow painted finish.

By W. H. PAXTON, JR.

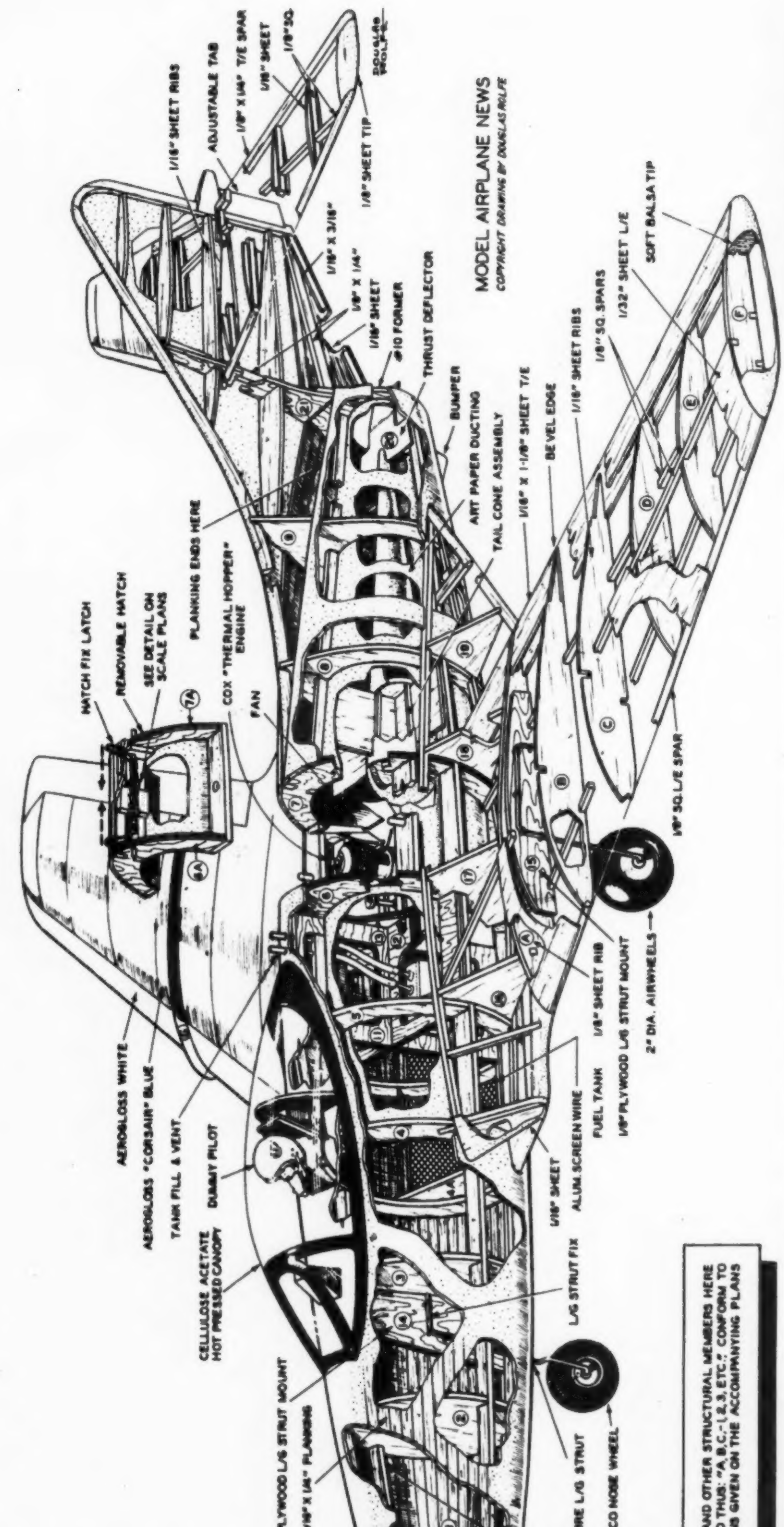
► To those of you fortunate enough to have seen the Navy Blue Angels perform their fantastic precision-flying act at the Nationals, no introduction to the Cougar is necessary. To the rest of you, well—maybe the pictures of this model will speak for themselves. The wing span is 28½ in.; length, 33¼ in.; flying weight is about 13½ oz. Power is supplied by the new Cox Thermal Hopper free flight engine, selected because of its terrific speed which was measured by strobe light with the metal fan shown at 17,200 rpm!

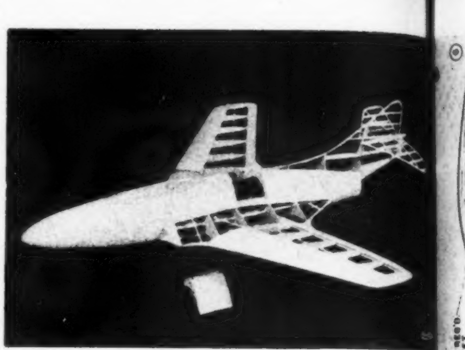
Construction of the model is not conventional but neither is it difficult if you take the time to study the plans and photographs and follow these step-by-step assembly sequence instructions:

1. In order to keep the weight to a minimum, be careful to select straight soft balsa for all bulkheads, ribs and for planking; medium soft balsa for all spars and longerons.

2. Cut out -11, -12 and -13 engine mount and supports from ⅛ basswood plywood. Add tin mounting plate with 3-48 nuts for engine.

3. Subassemble these using Ambroid cement and tie with thread the -13 mount to the -11 and -12 supports. Give





Ready for covering. Canopy added last. The fin and stabilizer are covered before the assembly.

entire assembly four coats of red Aero Gloss dope.

4. Tie and cement fuel tank in place.

5. Cut out top, side and bottom longerons and all bulkheads marking or notching locations of all attaching parts.

6. Pin top and bottom longerons to plans and cement one-half of bulkheads -2, -3, -4, -8 and -9 in place. Remove and cement other half of bulkheads.

7. Locate engine mount assembly between top and bottom longerons and cement in place.

8. Cement remaining bulkheads in place, including -4A.

9. Side longerons, screen wire support members and internal ⅛ x ¼ members may now be added.

10. Tie and cement nose landing gear wire to ⅛ plywood support and cement assembly to top and bottom longerons and to -3 bulkhead.

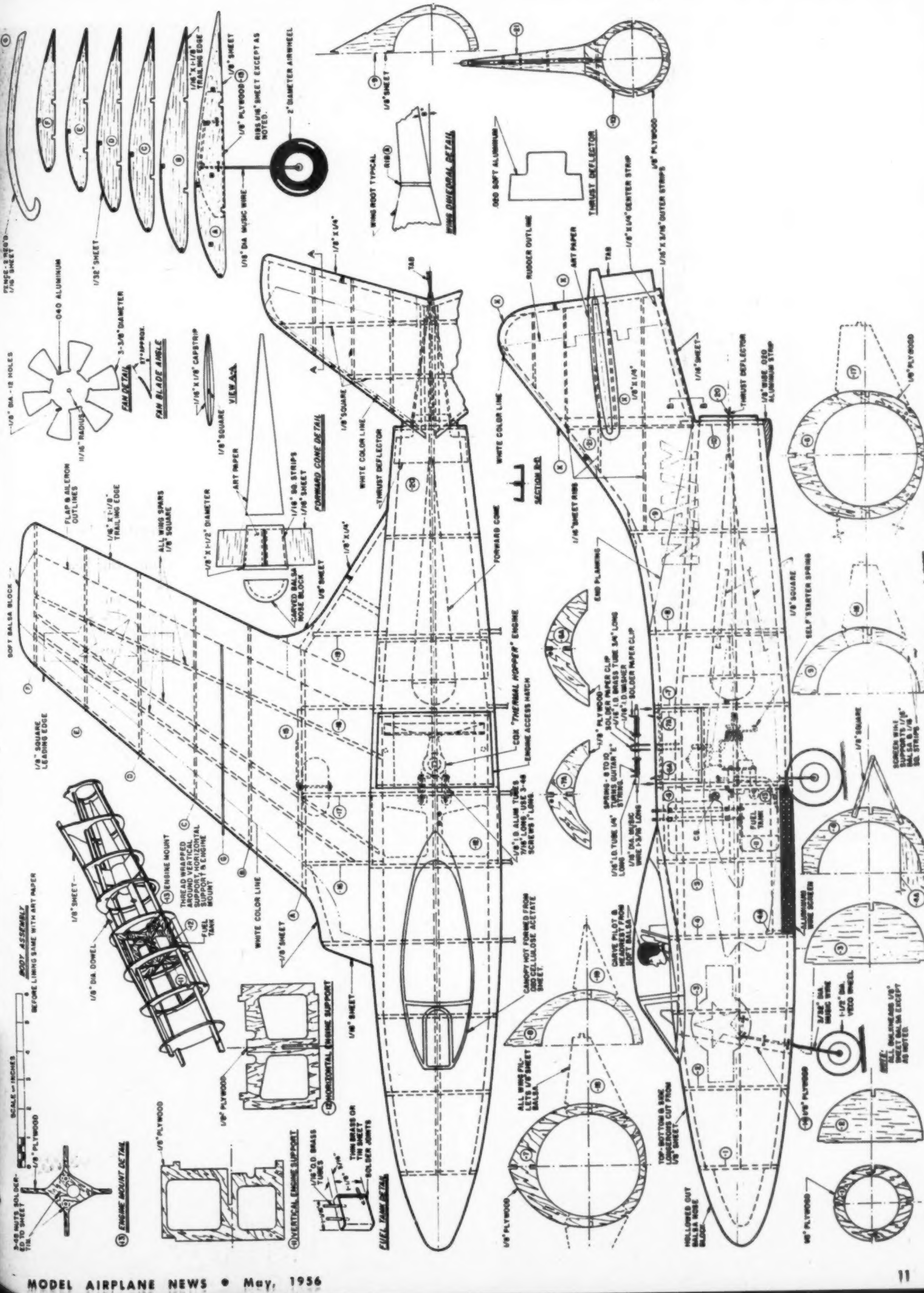
11. Build up hatch assembly within the fuselage and then cut top longerons to allow hatch to be removed for installation of the latch mechanism.

12. The inner tail cone is assembled in two halves as noted to allow easy installation. Apply four coats of red Aero Gloss dope before installing.

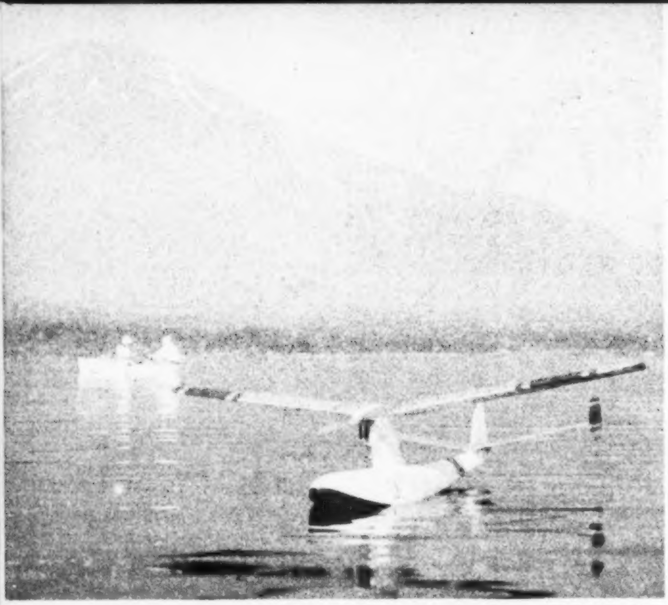
13. Interior of the fuselage is now lined with red Art Paper which has previously been given three coats of clear Aero Gloss. Note that, forward of the engine, only the top half of the fuselage is lined in order to allow entrance of air.

14. The (*Continued on page* 50)

Bottom view shows air recess opening in belly. Opening is covered with an aluminum screening.



FULL SIZE PLANS AVAILABLE. SEE PAGE 52.



Trim Nymph seaplane, built by Hide and Osamu Iwata, floats swanlike on a lake near famed Mount Fugi. As here, model from magazine plan.

During the war, the government decreed modeling for high school, college students, but today Japanese youth builds, flies models en masse.

Japanese Modeling today

By TOM PROBST

Because of the tremendous response to MAN's last article on Japanese modeling, author takes us on another trip to Nippon—meeting makers of kits, solids, engines.

Kinjiro Kondo tries out his U.S. 465 transmitter. Relatively expensive in Japan, radio models are scarce. Income averages about dollar a day.

► Before World War II, there was a great deal of model-building activity in Japan, all gas free flight or rubber power.

Material was inexpensive: many supplies were exported to the U.S. and Europe—things like silk, bamboo, rice paper and celluloid scale motors. Cost of a model could be figured in sen (worth about one-quarter cent in those far-off days). Best kits were no more than 50 sen (12½¢). Boys in high school and college were the chief model builders.

During the first part of the war, modeling received a big official boost when the government decreed students in high school and college should construct models as training for future air work. Shops and suppliers sprang up throughout the islands.

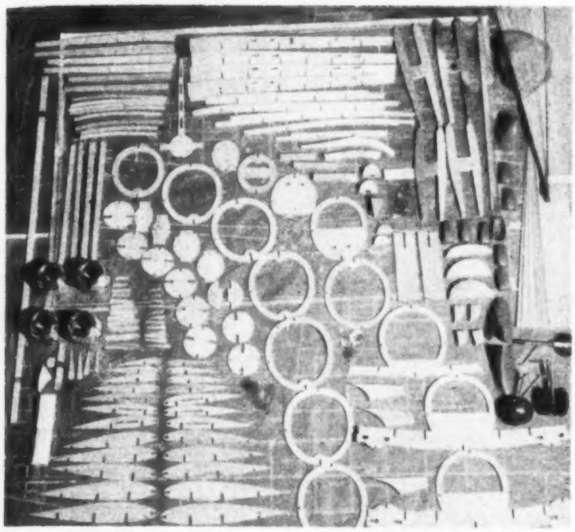
As the tide of war turned against Japan, model supplies became harder to find; materials were directed to war use.

After the war, the paramount problem for most Japanese became keeping alive. Luxuries like model aircraft were forgotten.

Since those terrible years, recovery has been swift in some Japanese businesses, non-existent in others. Model work is zooming but it is nowhere near wartime heights.

The average Japanese wage at present is a bit over $1 a day—and out of this come food, clothing, shelter and all

Skilled hands of Iwata craftsman delicately shape tail of DC-6B. Carving so good that little sanding is necessary to get perfect contour.



Put this together and you have a beautiful DC-6B U-control. Note extreme prefabrication, especially one-piece fuselage-nacelle bulkheads.

Sleek DC-6B stole show at All-Japan Aviation Day. Favorite colors for airplanes are those of U.S. Air Lines and various Far East companies.

other "bought" necessities of life. Thus only a few devoted hobbyists can afford a gas model, and this represents a real sacrifice.

Cost of rubber-powered craft is not so prohibitive. Kits range from 20 yen (5¢) to 150 yen (40¢) Biggest building season for the younger modelers is in January and February during school vacation period. Many models are New Year's gifts (the New Year in Japan is roughly like our Christmas: presents are exchanged and the whole nation has a holiday).

One big change since the war has been the age of the modeler. Today's hobbyist is older. However, younger children in elementary school are beginning to construct planes as handicraft projects, working on rubber-powered craft. Planes are generally fashioned of kiri or bamboo wood. Kiri is three times stronger than balsa but also three times as heavy and much, much harder to work. I know; I've tried.

Covering is tissue or silk, or kiri wood planking for a gas model. For color, the maker brushes on Japanese lacquer or dope. If he can afford a new motor (about $5), he buys one; otherwise, a used motor is installed. Often members of a club band together to buy and build a gassie.

Out of Japan's poverty have come many unorthodox designs. Flying saucers, broomsticks, witches, wings and the like are to be found at nearly every meet. Seaplanes are popular because of Japan's many lakes. On Sundays and holidays friends rally at a nearby lake for an afternoon of flying and swimming.

A Kit Maker

Japanese and American kit makers have little in common. Problems of manufacture, assembly and distribution are vastly different. Many Japanese kits are sold to foreigners: i.e., Americans, in Japan and Korea. Some are exported to the Philippines and southeast Asia but as yet this is only a trickle.

Let's look at a typical company. Eureka was started six years ago by an enterprising Japanese trader named Kamenosuke Kokubo. Before the war, Kokubo had been with Mitsui & Company, Ltd., in Java. The war's end brought him back to Japan where he became a purchasing agent for U.S. forces. In 1948 he set up a model supply company to answer GIs' demands for better models.

Eureka kits are made in typical Japanese fashion. Small home shops make components, other home shops package the kits, and finally the kits are taken to a shipping point in Tokyo. The home shops are *(Continued on page 53)*

On its way to Tokyo department store is Clipper Cemedine, built by Osamu and Hide Iwata, right. Pan Am's Dallas Sherman, center, pleased.

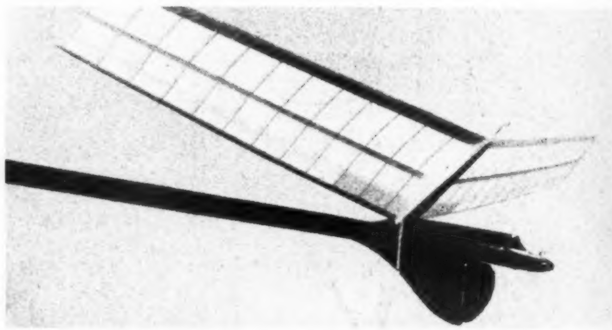
In Japan, the experience in building and flying "real" models ties in with flight. This group of young men receive instruction on Sentinel.

1955 Nordic Winner . . By Rudolf Lindner

The marvelously efficient tow-liner twice won for Germany.

Happy Rudi Lindner poses the model for pictures right after piling up the winning five-flight total of 886 seconds. Note auto-rudder turned.

This was the launch on the fifth and winning flight. Feeling no thermals, Lindner kept model overhead for full minute for tell-tale tug.



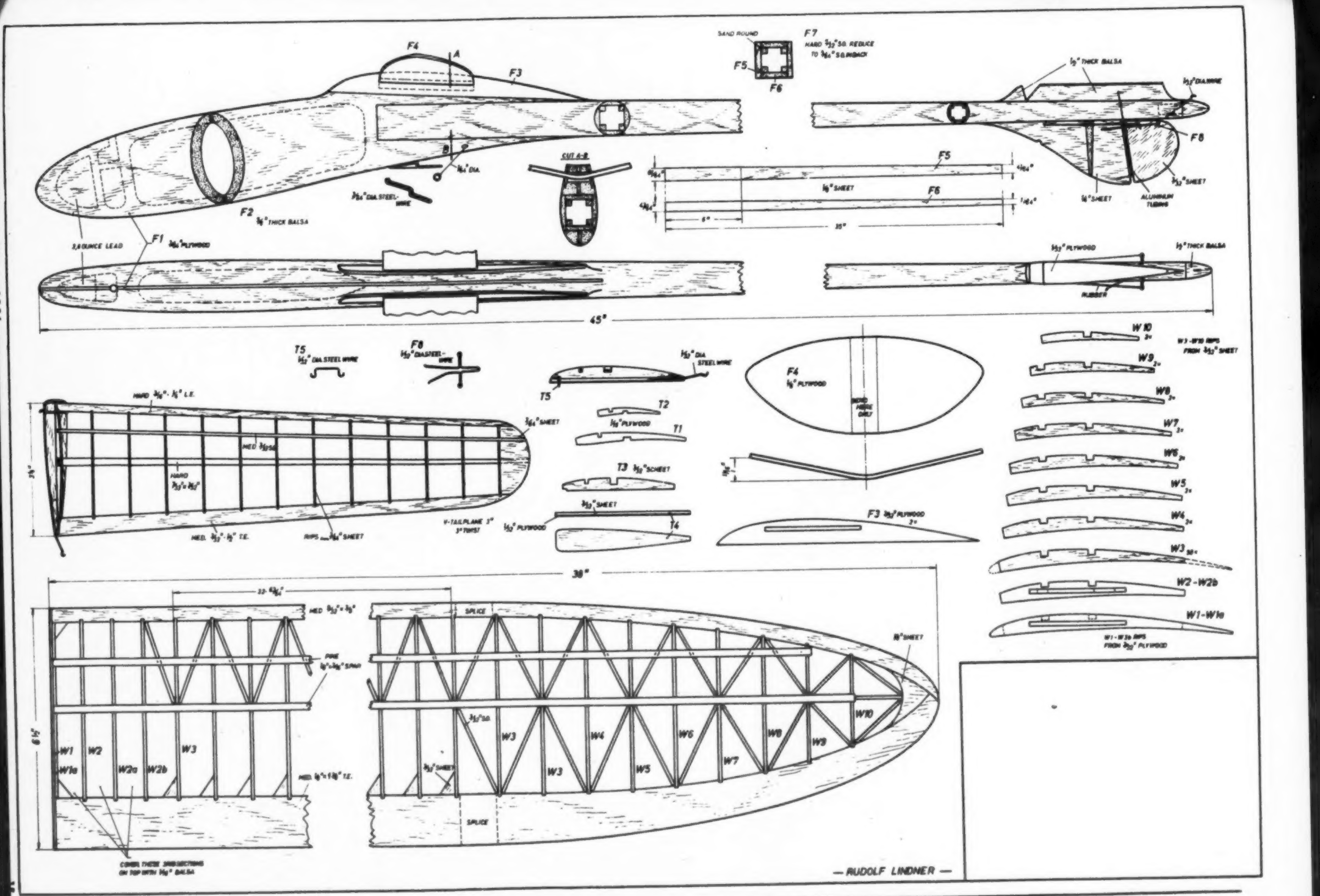
Pop-up tail with its dihedral and undercamber shows above, while, below, is pictured the ply tongues to which the knock-off panels mount.

► This winning A.2 for '55 is a development of my 1954 championship Nordic model, *Spinne*—in English, Spider. Even though Spider combined stability and low sinking speed, the 1955 champ shows further improvement of both characteristics. The fuselage and tail assembly are completely changed on the new model, while the wings are of the same type as on the 1954 plane. Here are the reasons for these changes.

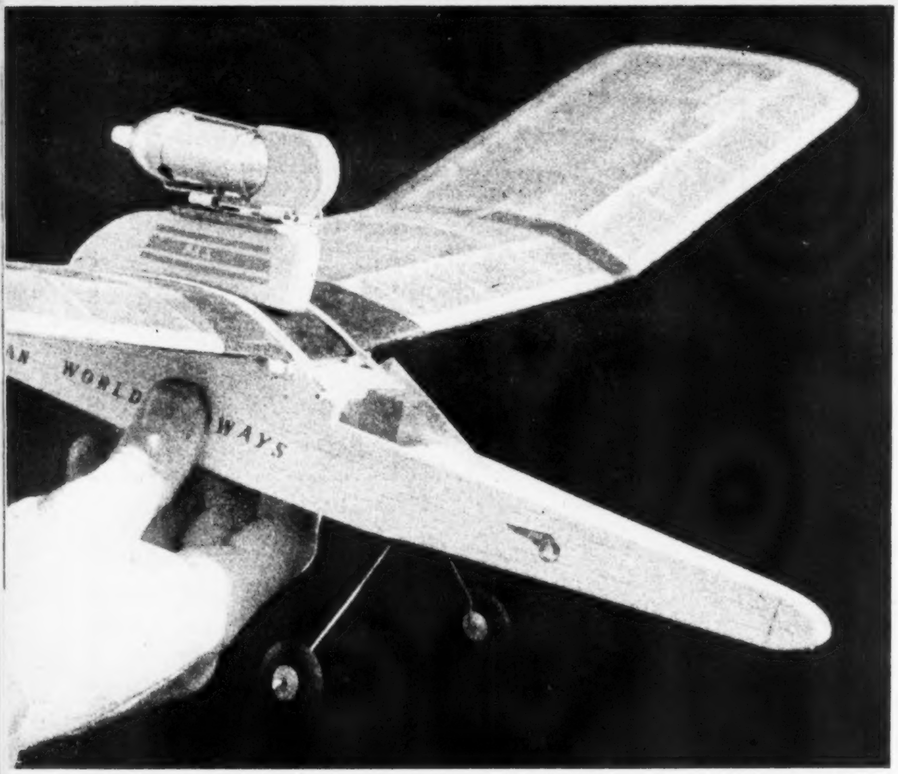
In order to improve flight stability and, consequently, efficiency, especially during thermal flights, it was necessary to reach a lower momentum of inertia. This was accomplished by lowering the weight of the tailplane carrier. The change of this section included a new profile as well as a new frame, resulting in slower sinking speed. Numerous flights for the purpose of measuring the testing differences between both models have demonstrated the correctness of this theory.

The 1955 champion attained the very low sinking speed of only 11½ in. per second and still showing good flying stability. Now, since this model is meant for advanced model builders, discussion is limited to only the most necessary instructions. The plan shows everything necessary, including materials and measurements. To avoid later difficulty, it would be best to select materials carefully. It is up to you to pick your starting point; however, experience seems to prove that starting on the wings is best.

In order to cut the balsa ribs to the exact shape, it is necessary first to cut ribs W.3 to W.10 out of 1/16 in. plywood. Since balsa slips off the plywood too easily, drive two pins into the plywood until (*Continued on page* 44)



FULL SIZE PLANS AVAILABLE. SEE PAGE 52.



NOW

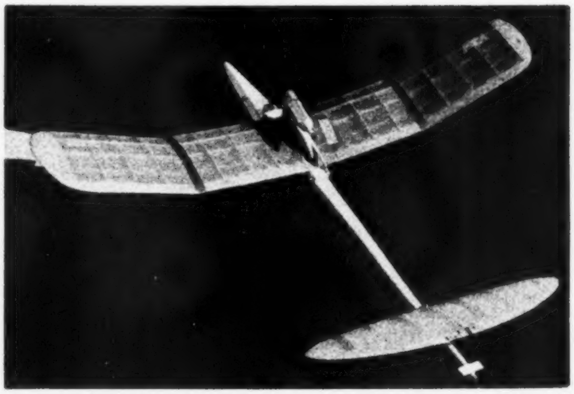
Jet Payload

Winner of the first Jet PAA-Load event at the King Orange Meet—the Jet Keed—a design by the Hertzson Brothers: Lee, Dave and Sy. A ship that needs dethermalizer!

Close-up shot shows how the jet engine attaches to the pylon. Flying surfaces were standard Half-A FF.

► The Jet Keed was designed for the PAA-Load event that was pioneered by Dallas Sherman of Pan American World Airways System. It took first place in the first such event ever run—at the King Orange Meet in Florida. The rules require a hand-launched flight and an ROG flight for total time. We did 2:12 on the first; 46 seconds in the second.

First news of this coming event was noted in the AMA news bulletin. The authors then began to talk up a ship which would be suitable and competitive. While a design could not actually be initiated because specifications were unavailable, trials were made with the Jetex 150 engine on solid-type gliders of 3 to 4 oz. total weight. These demonstrated the power and effectiveness of the engine and paved the way for the Jet Keed. It is not amiss at this point to note that the authors have been experimenting with Jetex-type models for over five years and were most desirous to see some type of Jetex event added to the AMA listings. This event therefore provoked quite a bit of satisfaction because it provided a different form of challenge, offering another medium of power for unusual expression.



Under-rudder design provides an automatic third point for taking off. High vertical tail raises rear end to the correct angle for take-off.

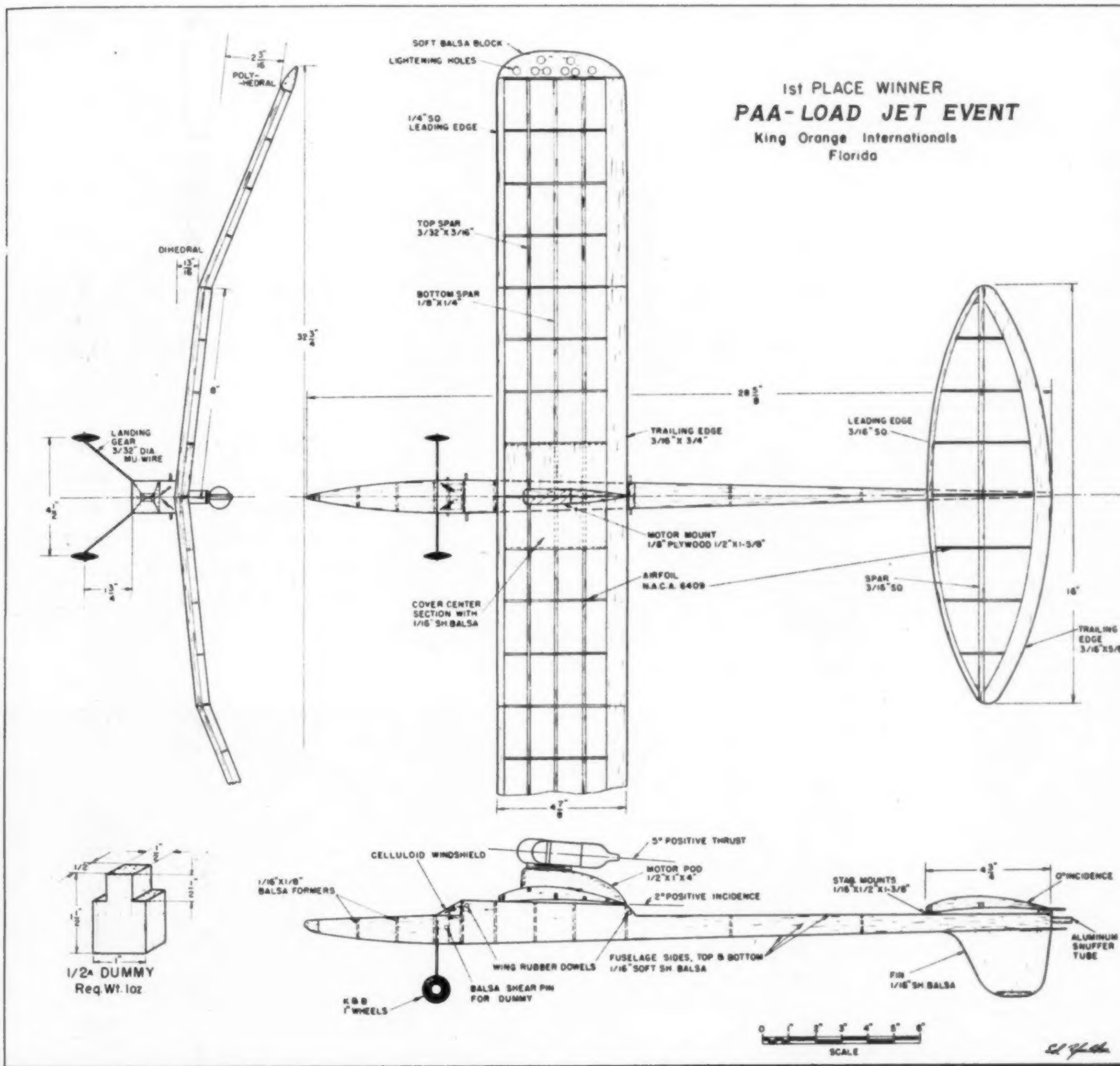
With the Jetex 150 engine specified under the rules, the Jet Keed did 2:12 when launched from hand, 46 seconds after taking off unassisted.

Notification of rules and regulations from George Gardner of PAA arrived a few days prior to leaving for Miami to compete in the King Orange Meet. One can then understand the tension that developed when three brothers got together on an embryo design. However, without being facetious, three heads were better than one and hastened the process of designing a new model.

The study and evaluation of the rules and regulations delineated the following factors:

1. The all-up weight of the model; that is, completed model, dummy pilot (1 oz.) and loaded Jetex engine must come in at a 5-oz. minimum.

2. No dimension of the model shall exceed 36 in. (pro-



jected).

3. Dummy pilot must have a body dimension of 1 x 1 x ½ in., surmounted by a ½ x ½ in. head.

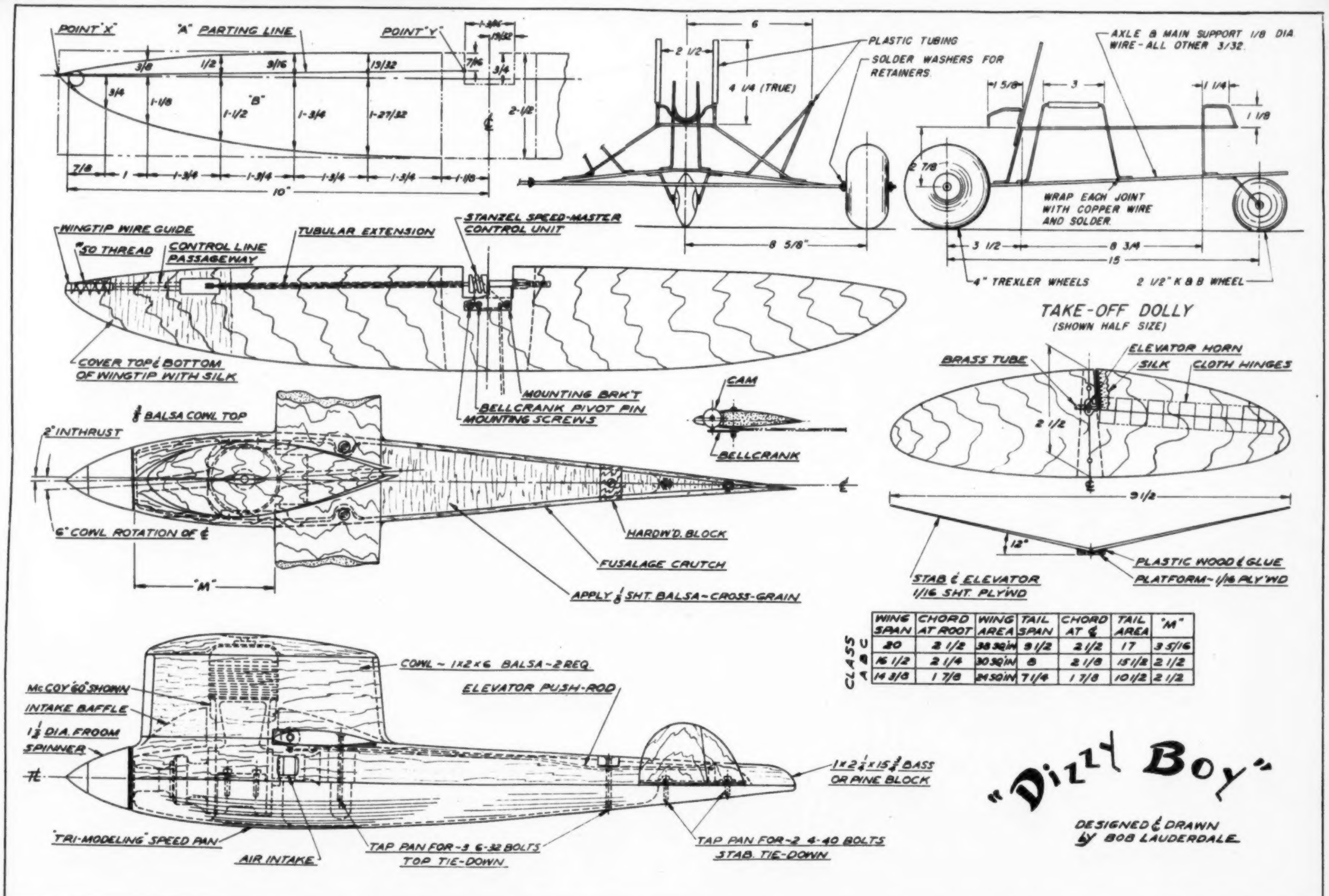
The above factors led to the adoption of a wing and stab from a former most successful Half-A FF that met requirements 1 and 2. All that remained to do then was design a fuselage. Focusing upon the dummy pilot, the eventual design was then made to carry him in a sleek, streamlined fuselage.

Provisions were made for the dummy pilot to have visibility in a bubble-type canopy cockpit. Wing and stab were then seated on flat mounts in their respective positions as noted on plan. The dummy of the Jet Keed was positioned ahead of the wing and a 1½ in. opening decided as most feasible so that dummy could be shifted. This method would assist in positioning for CG. It must be realized that, less a gas engine, nose weight was minimized. The 150 Jetex engine was mounted on the CG line of the wing. This step deleted the weight of the charge from consideration.

Flight characteristics are unusually good and the ship performs equally well in calm or windy weather. Climb is good and transition from power to glide is excellent when charge is exhausted. Glide is extremely good and stable owing to a fairly long tail moment and moderately high dihedral of the wing. Wing is set at a 2° incidence and stab at 0°. Resultant glide is fast but flat and model justifies prior discussion and analysis.

Best results have been obtained via hand-launch methods. Two minutes and better were recorded at the King Orange meet. Owing to the energy expended in ROG flights, not as much altitude can be obtained, with a resultant decrease in endurance. However it is recommended that some type of dethermalizer be utilized. Model shows ability to soar and a word to the wise is sufficient. A simple pop-up tail activated by a fuse inserted in a snuffer tube is adequate. One other note: fin was placed on the underside of the fuselage in order to have it act in undisturbed air because of the high-mounted Jetex engine. This placement also allows fin to become another take-off point and assists in ROG.

The plans are detailed for (*Continued on page 52*)



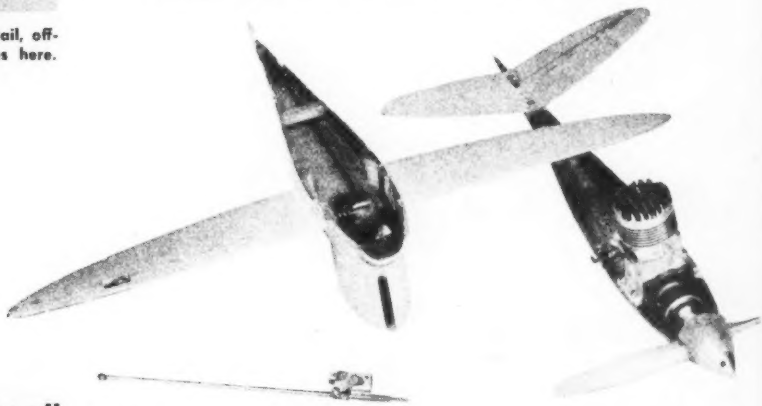
CLASS	WING SPAN	CHORD AT ROOT	WING AREA	TAIL SPAN	CHORD AT ℄	TAIL AREA	"M"
A	20	2 1/2	38 SQ.IN	9 1/2	2 1/2	17	3 5/16
B	16 1/2	2 1/4	30 SQ.IN	8	2 1/8	15 1/2	2 1/2
C	14 3/8	1 7/8	24 SQ.IN	7 1/4	1 7/8	10 1/2	2 1/2

FULL SIZE PLANS AVAILABLE. SEE PAGE 52.

High aspect ratio wings, typical of Mono-Line jobs; dihedraled tail, offset pressure cowl, staggered wings, are more evident features here.

The Mac .60 mounted in Champion pan. Note inflated pen bladder tank; in foreground, syringe, hypo for filling and spare tank, ready for use.

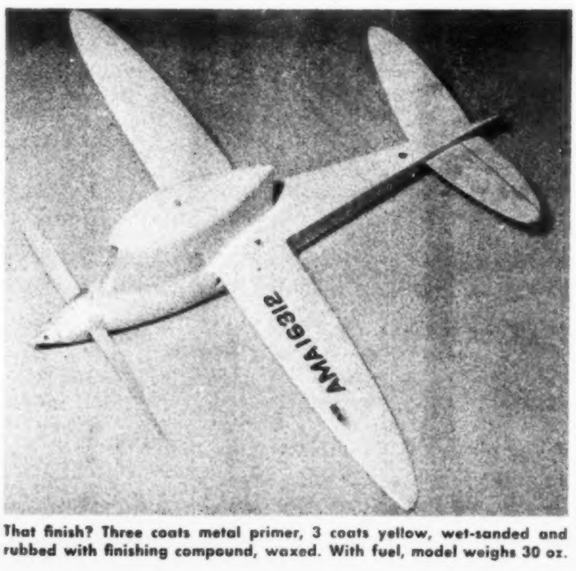
One Stanzel control unit is mounted in upper shell, while second unit is displayed, foreground. Model balance ¼ chord from leading edge.



DIZZY BOY

By BOB LAUDERDALE

Withholding nothing, the designer gives all the dope on duplicating his record-smashing Dizzy Boy. Engine modifications, fuels, props, the pan. It's a Mono-Line speedster.



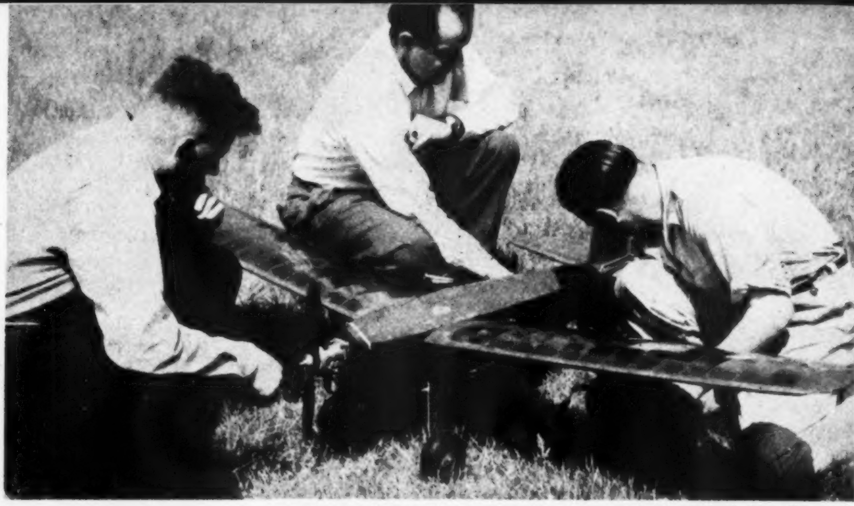
That finish? Three coats metal primer, 3 coats yellow, wet-sanded and rubbed with finishing compound, waxed. With fuel, model weighs 30 oz.

► Dizzy Boy was designed to use the Mono-line Speed-Master controls made by Victor Stanzel & Co. It also incorporates design features such as completely housed control unit, staggered speed wing and offset pressure cowling. A high speed or record breaking flight will depend on how carefully you build in these design features.

My Dizzy Boy has flown five times. The test flight was on 77 ft. lines and clocked 153.76 mph. The second flight was during the Wichita contest where Dizzy Boy pulled me off the pylon and no official time was made. The third flight was at the 1955 Nationals with a speed of 164.56 mph. For the fourth flight, a 9 in. dia., 12½ pitch propellor was used. Fuel was Farabend's "This Is It"—hopped up—and the engine was a McCoy .60. The speed was 168.47 mph. The fifth flight was at the Southwestern Championships in Dallas where Dizzy Boy turned just over 165 mph. In this contest John Belveal of the Tulsa Speed Team flew his Dizzy Boy for a new Senior record of 158.11 mph.

Dizzy Boy uses a Champion pan made by Tri-Modeling of Mesquite, Tex. The outside curvature of this pan is better suited to higher speeds. To start construction, note the end of this pan is about ⅛ in. thick. File this to a sharp edge, with all filing on one side only. Start 4 in. from the end and file to blend with the reflex in the pan. The rest of the pan should then be filed smooth and sanded with wet or dry sandpaper, then polished. The pan can now be drilled and taped for the four 6-32 engine bolts. Use a No. 33 drill to drill the holes. In locating these holes, allow for the left thrust angle shown on the drawing. (*Continued on page 39*)

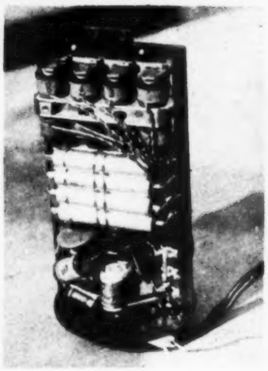
RADIO CONTROL NEWS

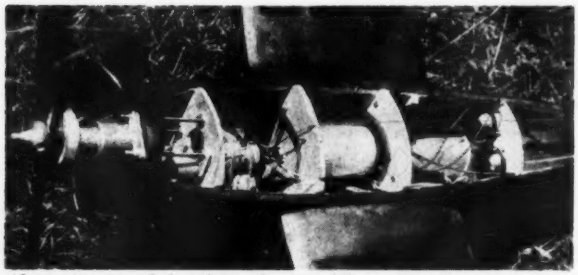


Schenker, left, and Fischer, right, of Switzerland, with their radio model using the Stegmeier equipment. Engine is the Fischer 9 cc Diesel. Left—Stegmeier receiver, showing eight relays. Pix by Rico Neidhart.

By E. J. LORENZ

As RC continues catching on all over world, news, ideas, pictures pour in. The best from everything is here compiled for your speedy reading.





Above—Interior of the plane, showing, left to right: battery compartment, the receiver, vacuum reservoir and the twin pneumatic actuators.

Second place winner of a single-channel event, International Contest, Germany, was this 10 cc-engined, 80 in. span job by Harald Kurth.

The flight line at German Nationals. Foreground, model by H. Chech, English receiver, Bonner escapement. Rear is Lichiuns' famous Cessna.

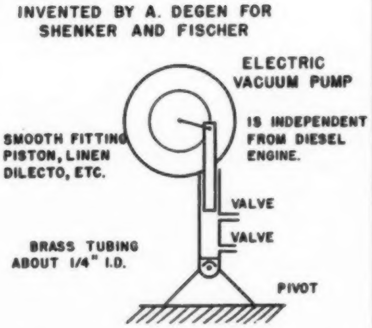
TECHNICAL TOPICS

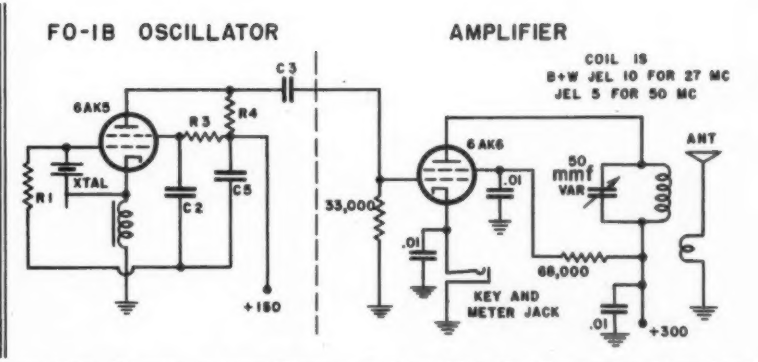
Last month we described the pneumatic servo system as given by E. Kreulein of Rotterdam, Holland. The system was conceived by the German builder Karl Heinz Stegmeier, who, incidentally, builds custom units for those desiring them. The pictures were from Rico Neidhart of Geneva, Switzerland. The accompanying photograph shows the interior of the plane built by the Swiss modelers, mentioned last month. The receiver as built by Stegmeier, in another photograph, shows the compact mounting of the receiver unit plus the relays which actuate the valves which are mounted on the other side of the panel. We have experimented with our version of the actuator itself and find it to be quite powerful. While on the subject of the reed receivers which are used for this type of system, we have some excellent photographs from Neidhart, showing the ED six-channel reed unit. It makes exclusive use of sub-miniature tubes.

Remember that FCC registration you were planning to send in? It won't convince the FCC, lying there on your work bench. There are FCC rules and regulations in the offing that could possibly have a bearing on our work, unless everything is legal and aboveboard. Incidentally, as a service to readers, MAN can distribute a limited number of application blanks. Just write for yours to 551 Fifth Ave., Rm. 1723, New York 17, N.Y.; then send the completed form to FCC at Washington 25, D.C. It's as easy as that.

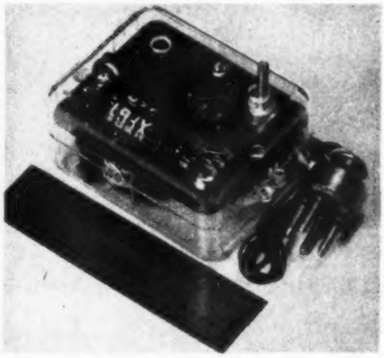
C. G. Morency, 4651 Park Ave., Montreal, P.Q., Canada, has a 14-lb., Fox .59-powered Live Wire with Babcock three-channel equipment. The anti-flyaway device as given in the Feb. '56 MAN is also used. Until now, Mr. Morency has been hand-launching this model. Not having a suitable runway strip, he has contemplated the use of a catapult, such as we described for the drone target plane in the April '54 issue.

Fig. 1 shows the principle of such a catapult. The main points to keep in mind are that the main gear should be accurately supported and guided during take-off and must be free to disengage at the end of the run. It is preferred that a guide point be used about half-way back toward the tail, also free to disengage at the end of the run. The framework may be made of

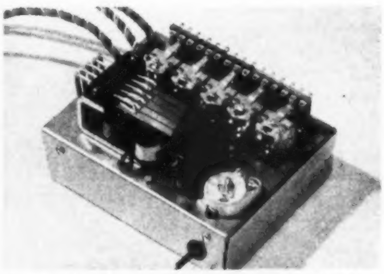




Top, left—Principle of pump for pneumatic actuator pump. Right—Schematic by Harry Hillman, Ann Arbor, Mich. (Fig. 2), crystal oscillator desrribed.



Transistorized Lorenz-type receiver by Gyro Electronics. Two ounces with relay, in a case.



This is the famous Bramco Gold Chip five-channel receiver, all out for "them that has it!"

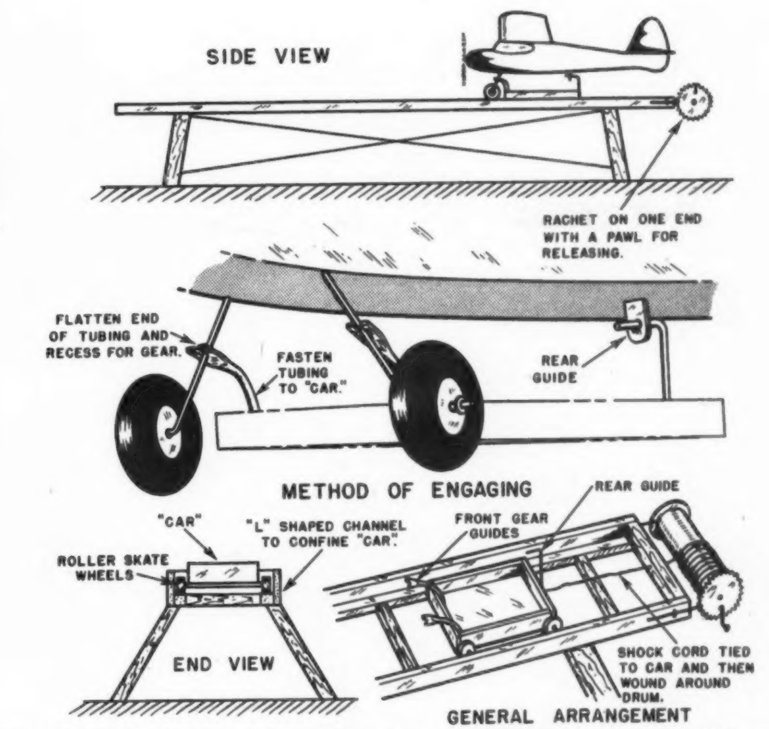
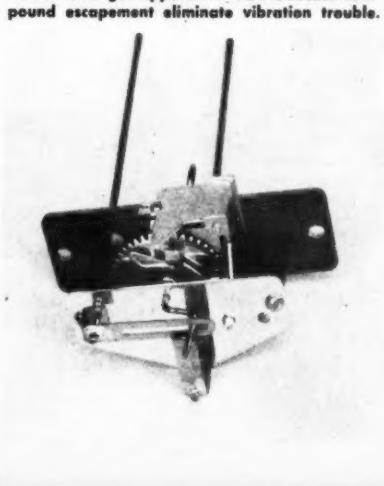


Fig. 1: Catapult enables C. G. Morency, Montreal, to get Fox .59-powered Live Wire (100% overload, at least) airborne. Details not supplied but sketch suggests idea. Builder must work it out.

3 in. furring strips and the rubber used to provide power may be aero-shock cord or strips of inner tubing. The engine of the plane should be running at top launching speed but be sure the launch does not force the plane into a stalling position. We see no reason why this technique cannot be used for large RC models.

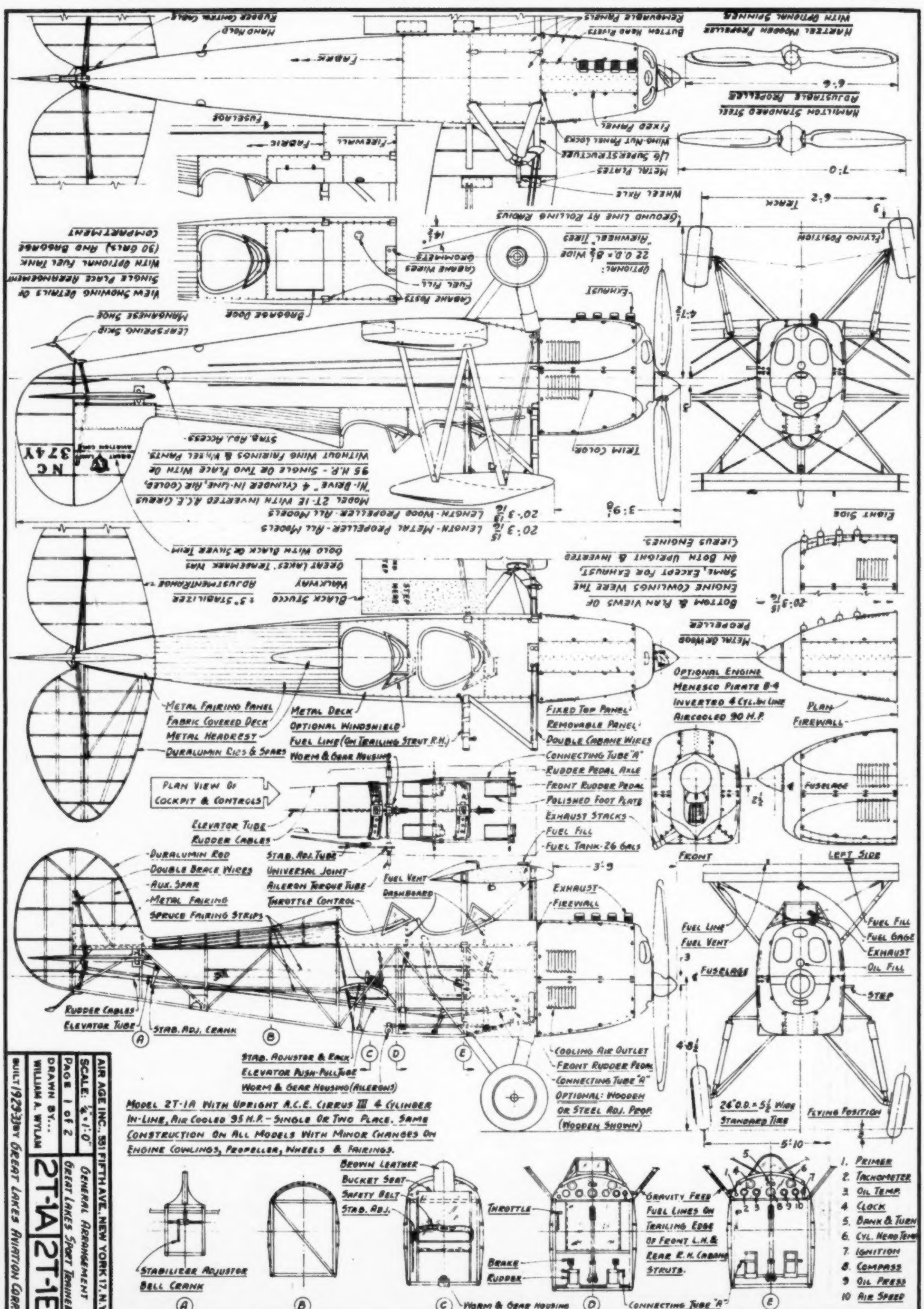
Fig. 2 shows the circuit as used by Harry Hillman of 1501 Avondale, Ann Arbor, Mich., in conjunction with the crystal oscillator described in the New Items section. This circuit is very stable and will provide all the power needed for carrier control of any receiver. The transmitter may be powered with three 45-volt batteries, in which case the 68,000 ohm screen resistor of the 6AK6 is removed, as is the .01 bypass capacitor. The (*Continued on page* 46)

Below—Changes apparent in new Babcock compound escapement eliminate vibration trouble.

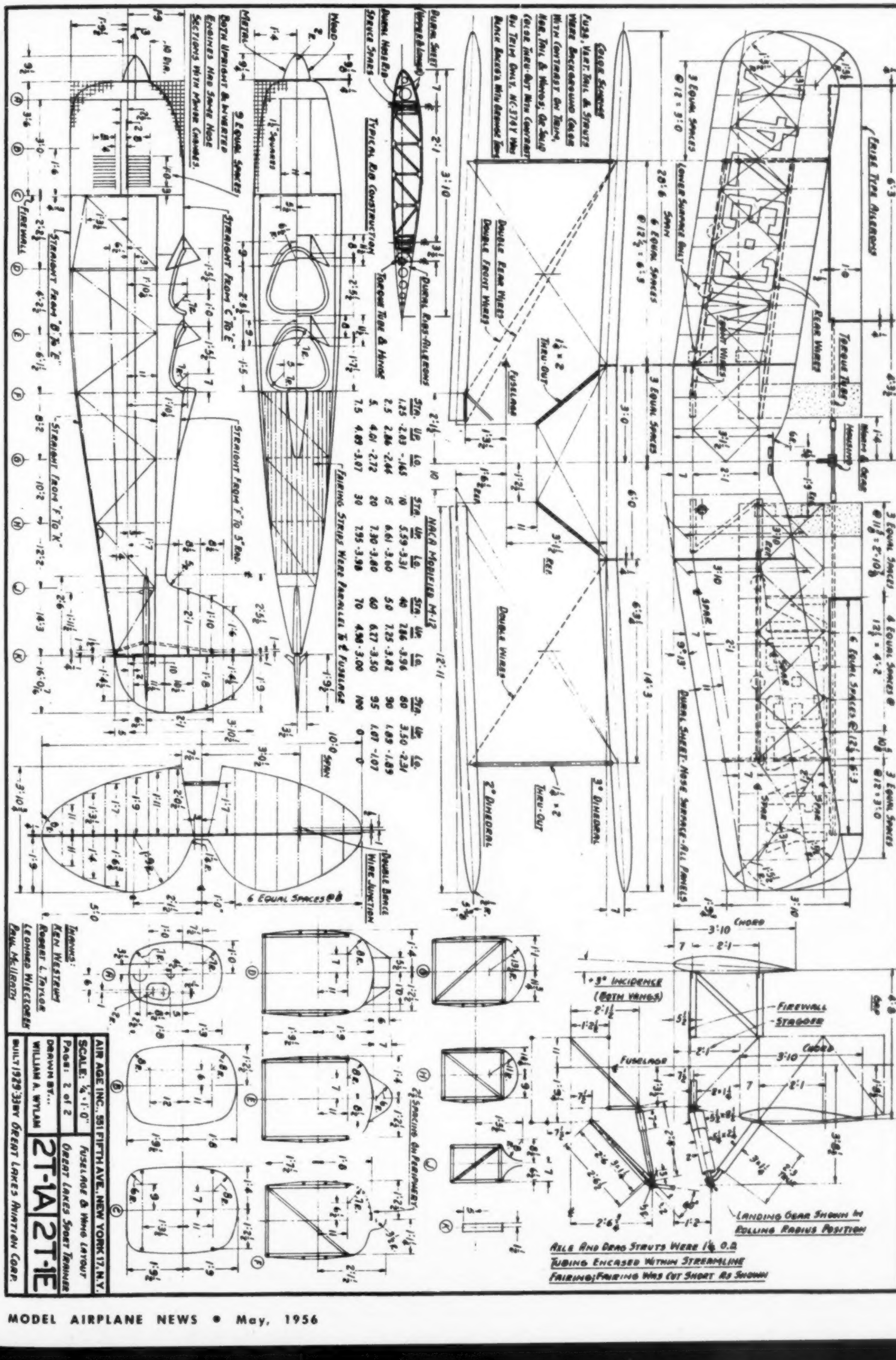


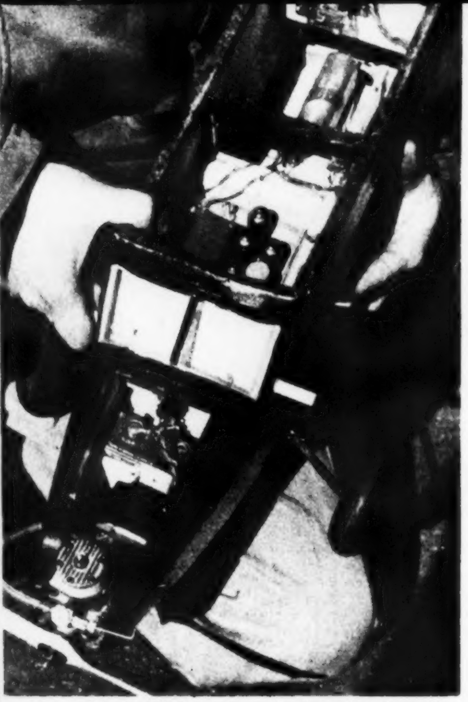
Wow! Zippy-looking shoulder wing RC is new Half-A kit by Babcock. Span is 42 in.

GREAT LAKES TRAINER—FAMOUS AEROBATIC SPORT JOB.



THE DRAWINGS ARE COMPLETE ON THESE TWO PLATES.

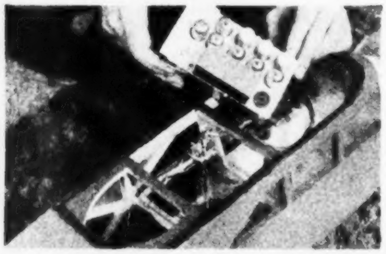




This installation shown in these drawings. The ship is third of series—three-views in March.

Notes on Multi . . Part 3

These greatly detailed drawings of one type of multi-control installation should be a boon to advanced RC'ers.



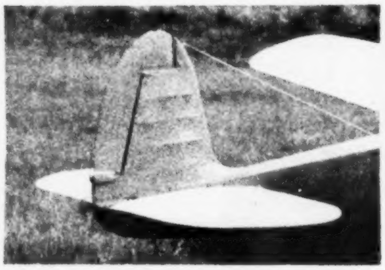
Babcock receiver flown in three ships. Plane No. One shown. Note the engine escapement.

► The first of three installments, March issue, reviewed the observations that resulted from staff experiments with multi-control, using the Babcock three-channel radio. The second installment provided a detailed drawing of the third and final airplane in a series. This installment, for what it may contribute in ideas and methods to multi-control in general, is rather thoroughly illustrated. (The deBolt-designed Equalizer in the Nov. '55 issue of MAN detailed Frank Schmidt's five channel reed receiver installation; Ernie Kratzet is now preparing a series of articles on reed multi-channel using the Bramco radio.)

In writing about experiments covering a year of building and flying, one would expect difficulty in finding a starting place. Surprisingly, the contrary is true. The article has to begin with the radio. In the beginning, the designer is not particularly aware of this, but in the long run discovers that the radio is the one completely reliable thing and that little else in the airplane will match the durability and reliability of the receiver. So, therefore, the effort lies in making other things as reliable as possible. The radio will not let you down, but something else almost certainly will.

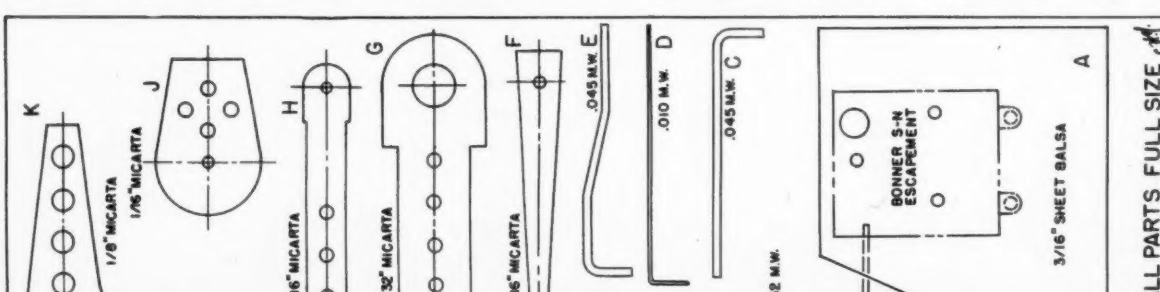
It must be assumed that workmanship is of a high order. Every soldered joint, every bent piece of wire, down to the finest detail, has to be reliable. If every detail is not right on the ball, it is not to be expected that reliability can be obtained. In plain words, you'll "bust" the ship. This is true of all radio control, even rudder-only. But now we are talking of multi: expensive equipment; time-consuming construction. While anything mechanical in any field sometimes will fail, the least we can do is minimize the additional hazards compounded by poor workmanship. Radio control, particularly multi, is hard enough without botching the job.

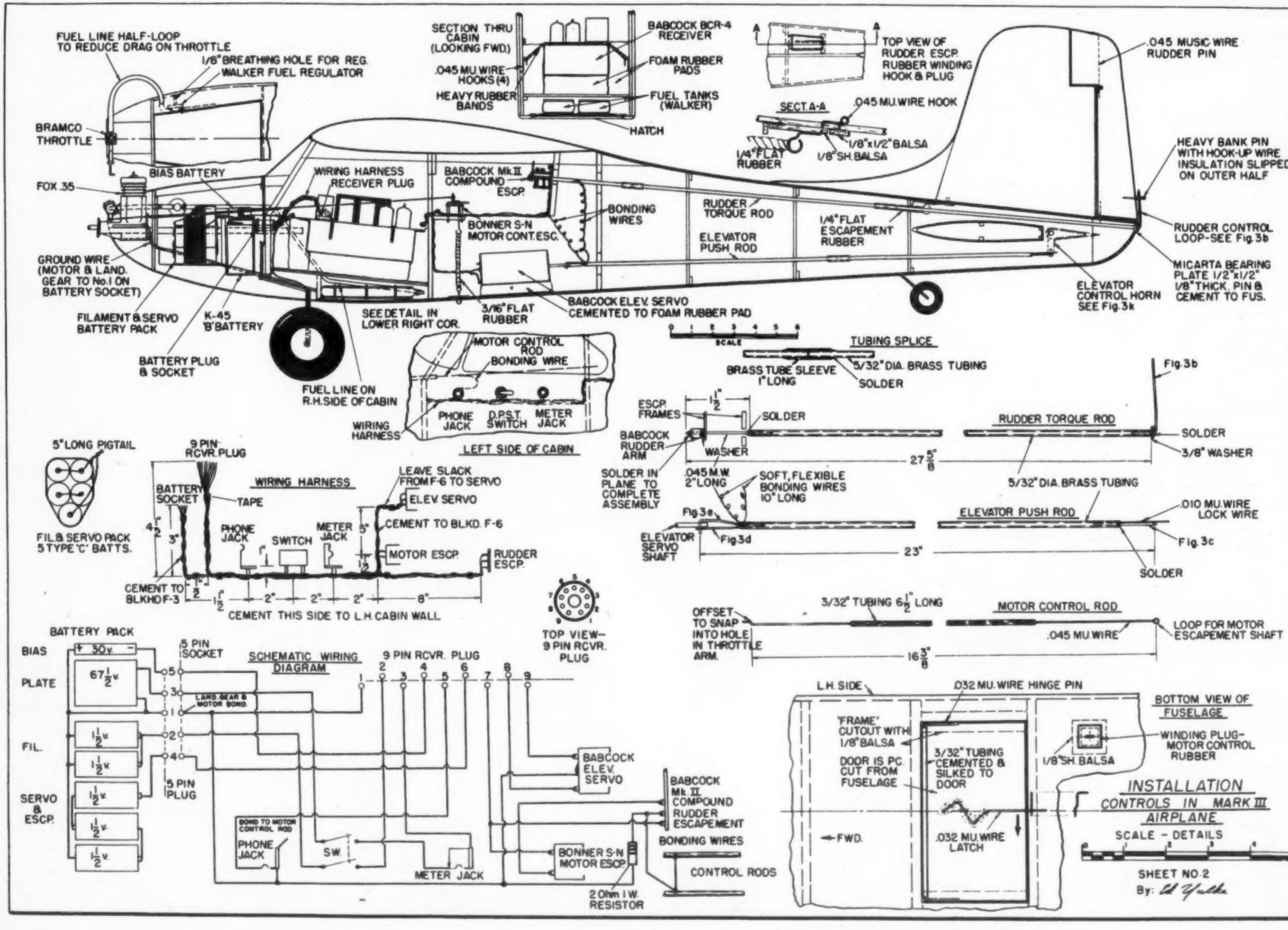
Since the radio is demonstrably reliable, it then becomes important to eliminate (*Continued on page* 48)



What balanced rudder looks like. Fin later increased for low-speed directional stability.

Adjusting second needle for air control. Later, Bramco throttle used to cut fuel consumption.



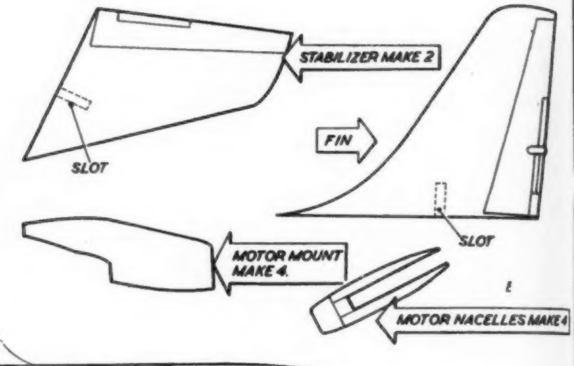


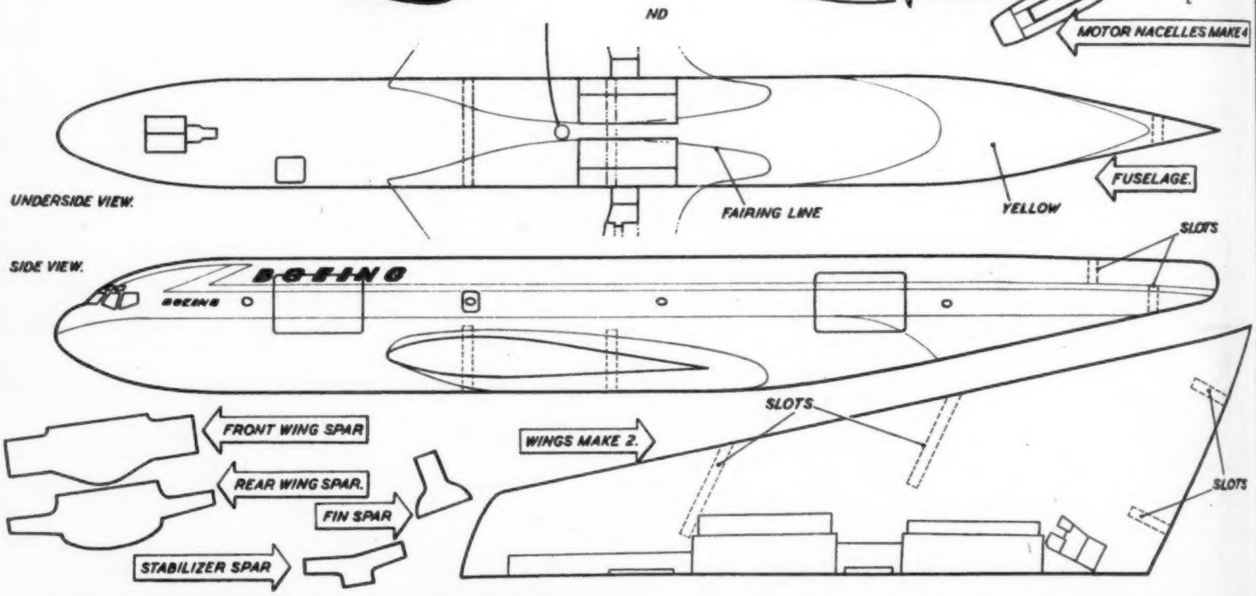
FUEL LINE HALF-LOOP TO REDUCE DRAG ON THROTTLE
1/8" BREATHING HOLE FOR REG.
WALKER FUEL REGULATOR
BRAMCO THROTTLE
FOX 35
BIAS BATTERY
WIRING HARNESS RECEIVER PLUG
GROUND WIRE (MOTOR & LAND. GEAR TO No.1 ON BATTERY SOCKET)
FILAMENT & SERVO BATTERY PACK
K-45 'B' BATTERY
BATTERY PLUG & SOCKET
SEE DETAIL IN LOWER RIGHT COR.
FUEL LINE ON R.H. SIDE OF CABIN
SECTION THRU CABIN (LOOKING FWD.)
.045 MU. WIRE HOOKS (4)
HEAVY RUBBER BANDS
BABCOCK BCR-4 RECEIVER
FOAM RUBBER PADS
FUEL TANKS (WALKER)
HATCH
BABCOCK Mk.II COMPOUND ESCP.
BONNER S-N MOTOR CONT. ESC.
BONDING WIRES
3/16" FLAT RUBBER
BABCOCK ELEV. SERVO CEMENTED TO FOAM RUBBER PAD
RUDDER TORQUE ROD
ELEVATOR PUSH ROD
1/4" FLAT ESCAPEMENT RUBBER
TOP VIEW OF RUDDER ESCP. RUBBER WINDING HOOK & PLUG
SECT. A-A
.045 MU. WIRE HOOK
1/8"x1/2" BALSA
1/8" SH. BALSA
1/4" FLAT RUBBER
.045 MUSIC WIRE RUDDER PIN
HEAVY BANK PIN WITH HOOK-UP WIRE INSULATION SLIPPED ON OUTER HALF
RUDDER CONTROL LOOP-SEE Fig. 3b
MICARTA BEARING PLATE 1/2"x1/2" 1/8" THICK. PIN & CEMENT TO FUS.
ELEVATOR CONTROL HORN SEE Fig. 3k
MOTOR CONTROL ROD
BONDING WIRE
WIRING HARNESS
PHONE JACK
D.P.S.T. SWITCH
METER JACK
LEFT SIDE OF CABIN
SCALE
TUBING SPLICE
BRASS TUBE SLEEVE 1" LONG
5/32" DIA. BRASS TUBING
SOLDER
Fig. 3b
ESCP. FRAMES
BABCOCK RUDDER ARM
WASHER
RUDDER TORQUE ROD
3/8" WASHER
27 5/8"
SOLDER IN PLANE TO COMPLETE ASSEMBLY
.045 M.W. 2" LONG
SOFT, FLEXIBLE BONDING WIRES 10" LONG
5/32" DIA. BRASS TUBING
Fig. 3e
Fig 3d
ELEVATOR SERVO SHAFT
ELEVATOR PUSH ROD
.010 MU. WIRE LOCK WIRE
Fig. 3c
23"
5" LONG PIGTAIL
FIL. & SERVO PACK 5 TYPE 'C' BATTS.
9 PIN RCVR. PLUG
BATTERY SOCKET
TAPE
WIRING HARNESS
LEAVE SLACK FROM F-6 TO SERVO
ELEV. SERVO
CEMENT TO BLKD. F-6
MOTOR ESCP.
RUDDER ESCP.
PHONE JACK
SWITCH
METER JACK
CEMENT TO BLKHD F-3
CEMENT THIS SIDE TO L.H. CABIN WALL
TOP VIEW- 9 PIN RCVR. PLUG
OFFSET TO SNAP INTO HOLE IN THROTTLE ARM.
3/32" TUBING 6 1/2" LONG
MOTOR CONTROL ROD
.045 MU. WIRE
LOOP FOR MOTOR ESCAPEMENT SHAFT
16 3/8"
BATTERY PACK
BIAS
PLATE
FIL.
SERVO & ESCP.
30v.
67 1/2 v.
5 PIN SOCKET
5 PIN PLUG
LAND. GEAR & MOTOR BOND
SCHEMATIC WIRING DIAGRAM
9 PIN RCVR. PLUG
BOND TO MOTOR CONTROL ROD
PHONE JACK
SW.
METER JACK
BABCOCK ELEV. SERVO
BONNER S-N MOTOR ESCP.
2 Ohm 1 W. RESISTOR
BABCOCK Mk. II COMPOUND RUDDER ESCAPEMENT
BONDING WIRES
CONTROL RODS
L.H. SIDE
.032 MU. WIRE HINGE PIN
'FRAME' CUTOUT WITH 1/8" BALSA
DOOR IS PC. CUT FROM FUSELAGE
3/32" TUBING CEMENTED & SILKED TO DOOR
.032 MU. WIRE LATCH
FWD.
BOTTOM VIEW OF FUSELAGE
WINDING PLUG- MOTOR CONTROL RUBBER
1/8" SH. BALSA
INSTALLATION CONTROLS IN MARK III AIRPLANE
SCALE - DETAILS
SHEET NO. 2

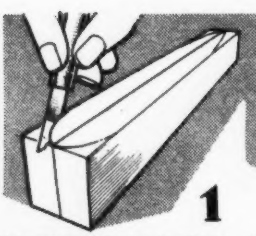
BUILD AN AUTHENTIC REPLICA OF BOEING'S NEW JET LINER.

SOLID BOEING 707

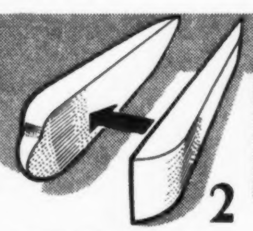
By BILL DEAN



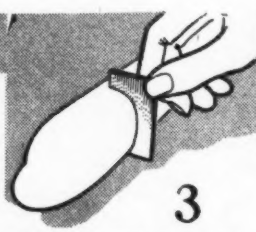




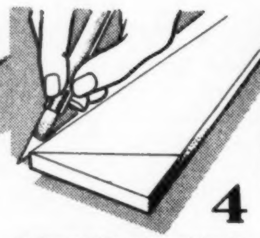
1 Spot-cement two of the proper size soft balsa blocks together for the fuselage. Mark on the top view—then cut away excess wood with the knife or with jig, or coping saw.



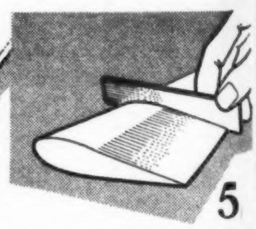
2 Separate the blocks carefully and mark the side view outline on the inner face of one, then cut away surplus wood. Cement blocks together again and carve second block.



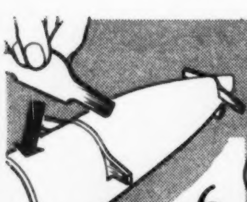
3 Cement fuselage cross-section patterns to stiff cardboard and cut out. Carve and sand blocks to the final shape, using the templates at the various stations indicated.



4 Cut the wing, stabilizer and fin panels from the nearest size sheet balsa and taper the parts in the thickness toward tips. Dress edges by large, home-made sanding block.



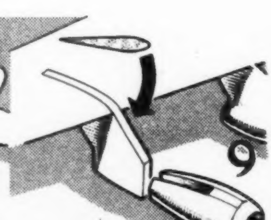
5 Cement airfoil section patterns to stiff cardboard and cut out. Carve and sand wing, stabilizer and fin panels to their proper shapes using these templates as indicated.



6 Cut slots in fuselage as shown in the pattern and cement the wing and stabilizer templates in place.

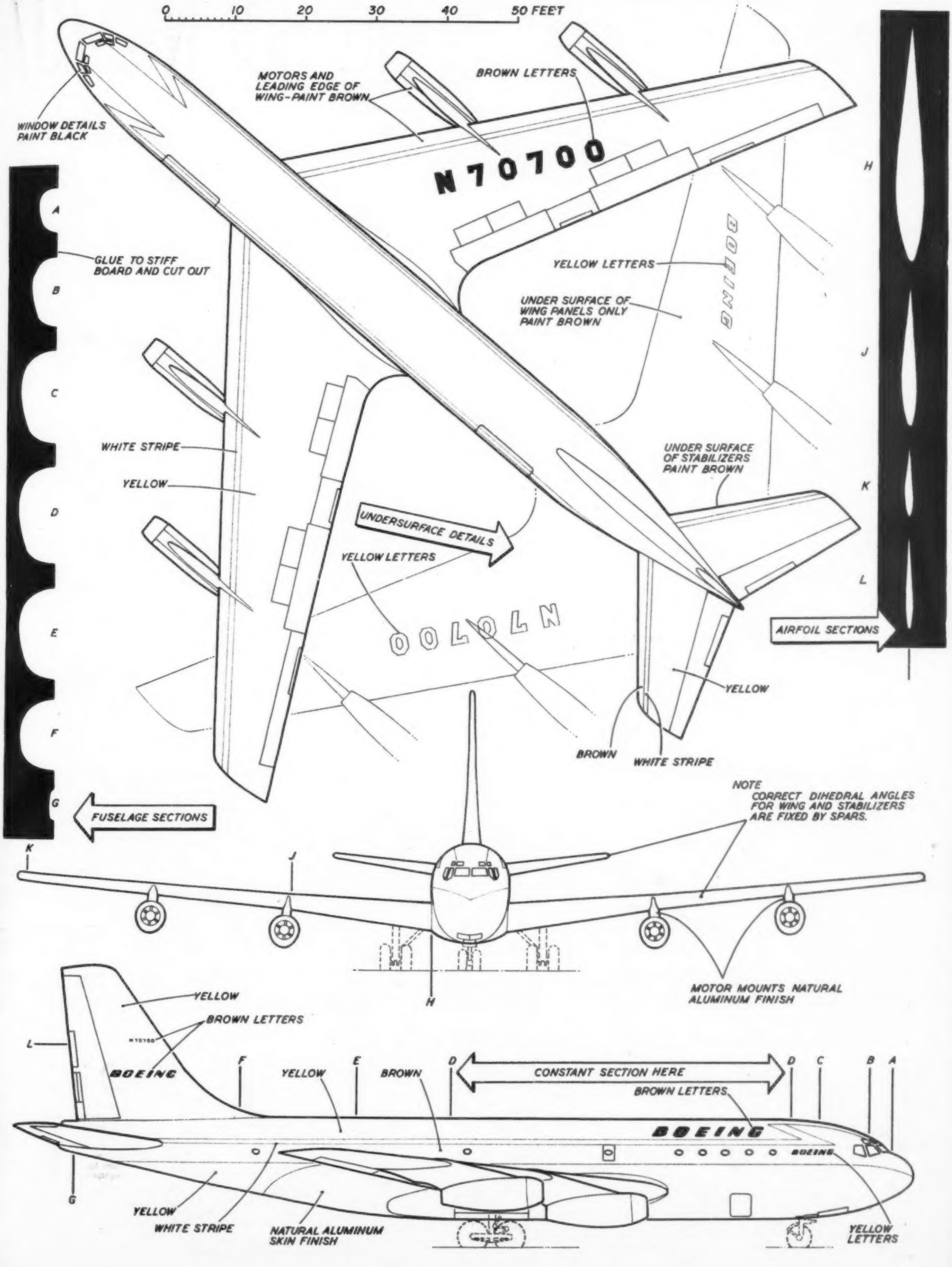
7 Cut slots in wing roots to match the spar templates. See drawing at top. Make wing fillets from plastic wood and, when dry, sand carefully to final shape. Plastic Balsa also used for fillet material.

8 Cement stabilizer and fin pieces in place. Carefully check alinement of all surfaces in both top and front views. The spar templates already in position insure the proper amounts of dihedral.



9 Mark off and cut out motor nacelles and mounts. Cement in place; sand to the correct cross-section. Don't mar adjoining parts—care!

10 Give the finished model two coats of wood filler or sanding sealer; sand smooth before painting. The color scheme details are provided on the adjoining three-view of completed model. Mark control surfaces outlines with darker shade of silver than the over-all finish. For super duper finish, brush on as much as half-dozen coats of colored; sand with wet-and-dry paper between the coats. Put down light color first, then dark, using masking tape for crisp edges. Stand is on page 32.

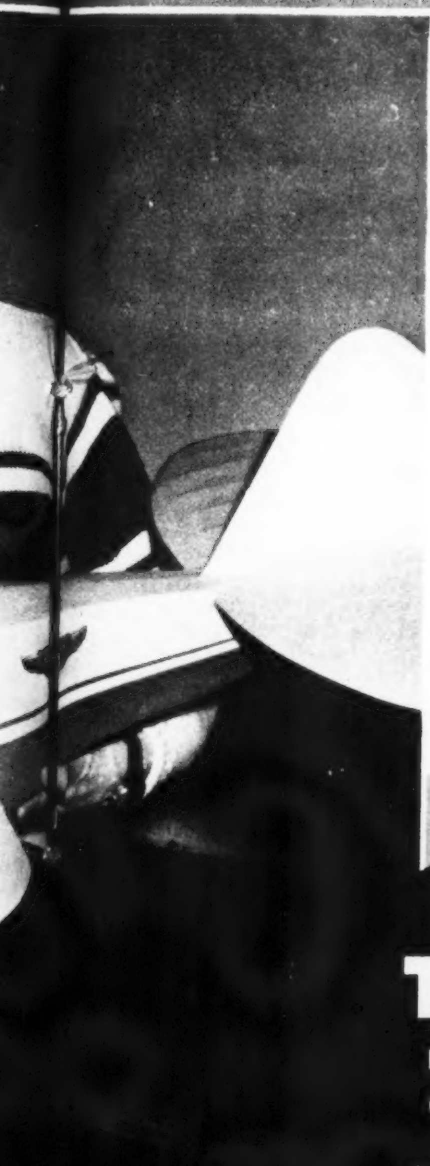


0 10 20 30 40 50 FEET
WINDOW DETAILS PAINT BLACK
MOTORS AND LEADING EDGE OF WING-PAINT BROWN
BROWN LETTERS
N70700
H
A
GLUE TO STIFF BOARD AND CUT OUT
B
BOEING
YELLOW LETTERS
UNDER SURFACE OF WING PANELS ONLY PAINT BROWN
J
C
WHITE STRIPE
UNDER SURFACE OF STABILIZERS PAINT BROWN
YELLOW
K
D
UNDERSURFACE DETAILS
YELLOW LETTERS
L
N70700
AIRFOIL SECTIONS
E
YELLOW
F
BROWN
WHITE STRIPE
G
FUSELAGE SECTIONS
NOTE
CORRECT DIHEDRAL ANGLES FOR WING AND STABILIZERS ARE FIXED BY SPARS.
K
J
H
MOTOR MOUNTS NATURAL ALUMINUM FINISH
YELLOW
BROWN LETTERS
L
BOEING
F
YELLOW
E
BROWN
D
CONSTANT SECTION HERE
D
C
B
A
BROWN LETTERS
BOEING
BOEING
G
YELLOW
WHITE STRIPE
NATURAL ALUMINUM SKIN FINISH
YELLOW LETTERS

JANUARY 7, 1956

SKIP FELDM
ENDURANCE FLI
19 HOUR

MANN SETS NEW WORLD
LIGHT RECORD OF
R-3 MINUTES USING



TESTORS "39"

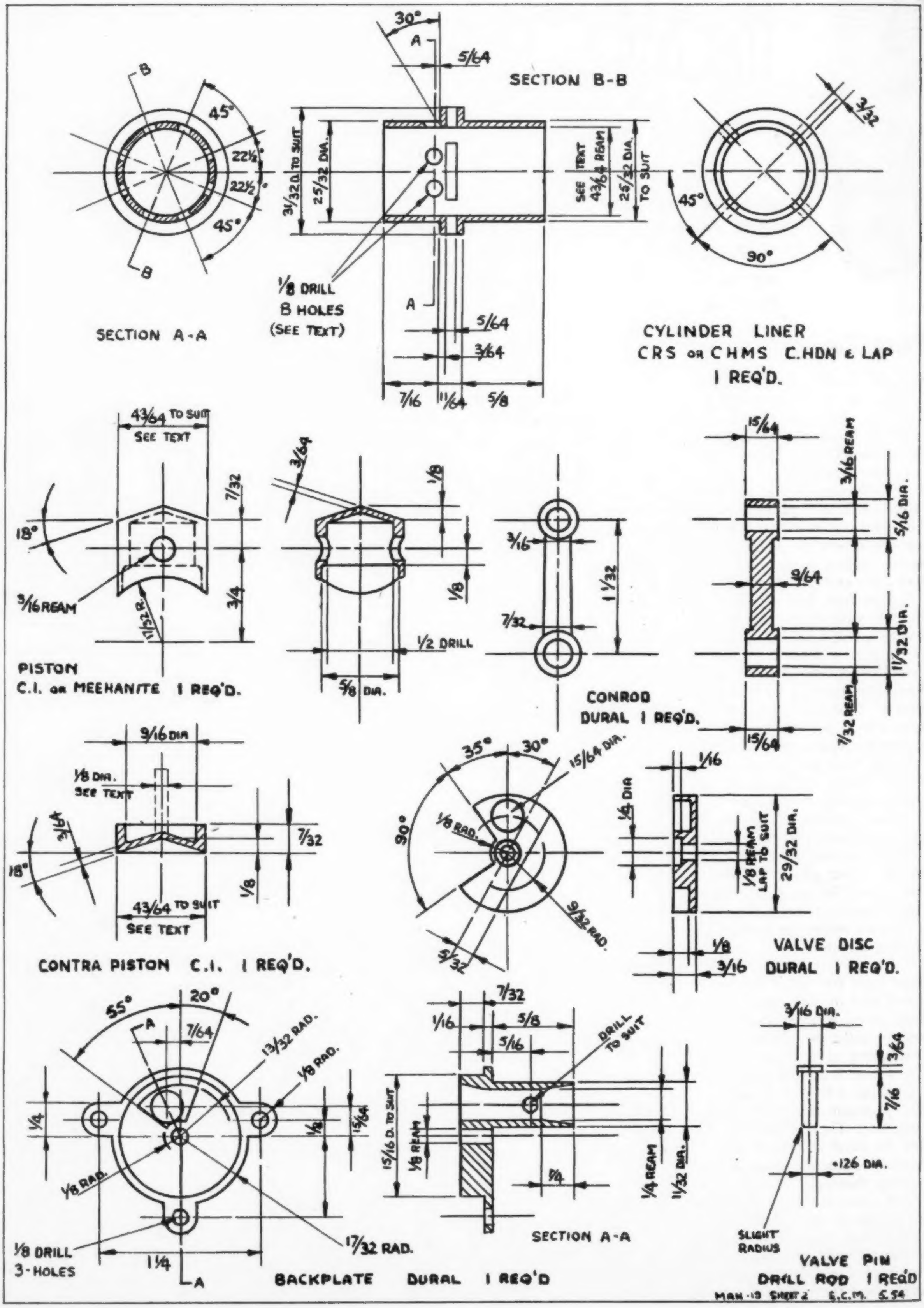
Skip Feldmann, of Skip's Island Hobby Shop, Flushing, New York, reports this history-making event as follows: "The plane was a Piper Tri-Pacer with exaggerated cord, flown by a team of four fellows taking turns at the handle until tired. The flight team, besides myself, consisted of Barrie Freeman, Jamaica, New York; Ed Delp, Queens Village, New York; and Dick Bertrand, Kew Gardens, New York . . . Fuel was pumped from a main tank under pressure to a one-quart reserve tank within the plane. The reserve tank was filled at intervals of every ten to fifteen minutes." The fuel used for the flight was Testor's "39"—and in reporting *this* fact, Mr. Feldmann concludes "There is no margin for error when the 'Champs' fly. That's why we all insist on Testor's all the way."

YES! YOU CAN BE SURE IT'S

THE RIGHT FUEL

FOR ENDURANCE, SPEED, STUNT, CONTEST, AND JUST-FOR-FUN FLYING

TESTOR CHEMICAL COMPANY, ROCKFORD, ILL.


SECTION B-B
SECTION A-A
1/8 DRILL
8 HOLES
(SEE TEXT)
CYLINDER LINER
CRS or CHMS C.HDN & LAP
1 REQ'D.
PISTON
C.I. or MEEHANITE 1 REQ'D.
CONROD
DURAL 1 REQ'D.
CONTRA PISTON C.I. 1 REQ'D.
VALVE DISC
DURAL 1 REQ'D.
BACKPLATE DURAL 1 REQ'D
SECTION A-A
VALVE PIN
DRILL ROD 1 REQ'D
MAN-13 SHEET 2 E.C.M. 5.54

the MAN .19

By E. C. MARTIN

Continuing a three-part construction series for home-built engines. Shop classes, individuals with metal working equipment, will discover hours of rewarding pleasure.

Part Two

► Last month, it was shown how the crankcase was roughed out in stages. Additional drawings in the first installment showed final dimensions and should be kept handy for reference as we go on with the construction of the engine. The progressive machining steps are as follows:

1. Mount the roughed-out workpiece by its beam lugs to a right angle plate, back face outward, and clamp securely. Bolt the angle plate to the lathe face plate with the center line of the workpiece on dead center. Check with tailstock center on workpiece centerpunch mark and set square on face plate and top and side faces of workpiece. Start lathe and double-check visually.

2. Skim back face with light cut, center drill; drill straight through with 23/64 in. dia drill; ream with ⅜ in. dia. reamer, using kerosine or fuel oil as lubricant. Reface back 1⅜ in. dia. x ⅛ in. deep, thus establishing the final back face of crankcase. The projections left on the mounting lugs should be filed off flush at the end of this matching operation. Bore out inside of crankcase to drawing dimensions less 1/64 in. Remove face plate from lathe and remove workpiece from angle plate.

3. Fit three-jaw chuck and very firmly clamp a piece of ⅝ in. dia x 3½ in. scrap steel rod, leaving about 2 in. projecting from chuck. Carefully turn a 1¼ in. long mandrel to secure binding fit for the ⅜ in. dia. reamed bore and, when quite sure that the crankcase is firmly mounted, finish bores to drawing dimensions, using the ⅞ in. OD ball bearing as a plug gauge for the bearing housing. Take great care over this operation, using very light cuts until the bearing begins to enter the grip. The final dimension should be .001 in. under the bearing diameter if you have suitable gauging equipment.

4. Reverse the crankcase on the mandrel and rough and finish bore the outer bearing housing, again taking great care. The ⅝ in. dimension between the two bearing housing inner faces is most important and is best achieved by measuring the original amount of metal to be removed and then boring to the required depth. You can actually go between dead ⅝ in. and plus-1/64 in. on this dimension without getting into trouble and it is safest to aim at the high side. A slight error can then be offset in the crankshaft machining. The exterior of the front crankcase portion can now be finish-machined and the workpiece removed and checked, particular note being taken of the final bearing housing spacing.

5. Replace face plate and angle plate on lathe and mount the crankcase on its back face with the top pointing toward the tailstock. Clamping can be accomplished by bolts and washers through the main bearing, but do not overtighten. The back face should be exactly 17/32 in. below dead center, and the undersides of the beam mounts parallel to and equidistant from the face plate. Check carefully and then skim the top face of the crankcase to exactly 1-11/32 in. from the underfaces of the mounting lugs. This is vital as subsequent machining will be gauged from the top face. Center drill and drill through about ⅜-½ in. dia., using very light feed and plenty of lubricant so as not to disturb workpiece, and bore out to ⅞ in. dia. to a depth of ⅞ in. Next, bore exactly 31/32 in. dia to a depth of exactly 11/32 in. and screw-cut 1-40 threads down to within ⅛ in. of shoulder. We used 60° thread form as this gives a .015 in. deep effective thread. Now take a .005 in. skim off shoulder and the interior is finished. Rough and finish exterior to drawing and remove from lathe. This completes the crankcase machining.

6. The exhaust stack is most easily hollowed with an end-mill, but not possessing the luxury of a milling machine, we drilled a series of ⅛ in. holes and filed out the remainder by hand, taking great care not to mark the surface of the inside shoulder. The exhaust stack spacers of ⅛ in. and 5/32 in. should not be reduced in size as they hold the top and bottom of the engine in opposition and take the firing stresses in tension. Likewise, the exhaust stack wall thickness should not be reduced, but, if anything, left on the thick side. The mounting holes and backplate retaining holes can now be drilled and tapped to complete the component for test purposes. The fancy bits of filing, etc., necessary to produce a finished lightweight crankcase can wait until you are satisfied with the operation and performance.

Crankshaft

A welcome relief from filing is offered by the crankshaft and, since its completion will relieve your anxiety regarding ball bearing alinement, we will deal with it next.

1. Take the piece of 1 in. dia x 4 in. CRS and center drill both ends.

2. Set up in four-jaw chuck exactly 9/32 in. off center, projecting ⅝ in. from jaws. Using a heavy cut-off tool, or one similar, rough out the crankpin, leaving a section of material 3/16 in. long at the end of original diameter, thus retaining the center drilling. Finish-turn the crankpin, using a slightly cranked tool to undercut the counterweight, to 7/32 in. dia exactly. (*When we say "exactly" we mean as near as you can get. The word is used in order to avoid stating tolerances which may confuse the less experienced. Most of the dimensions are not critical. Where they are, we say "exactly."*) Finally, center drill and drill 3/32 in. to the required depth.

3. Remove work from four-jaw and lay aside while making a couple of experimental mandrels from scrap to a binding fit in the ball bearing bores. Check the exact sizes arrived at with the micrometer.

4. Next, put the shaft blank between centers and turn to drawing, using the sizes found where the drawing says "to suit," remembering to compensate for crankcase error on the ⅝ in. dimension. You can go between size and minus -.010 in. if the crankcase is within the limits. Screwcut the ¼ in. thread and then take a half-thousandth cut, starting 7/32 in. from the crankdisc, right along the ⅜ in. portion, and another half-thousandth cut, 7/32 in. from the shoulder, right along the ¼ in. portion, including the thread.

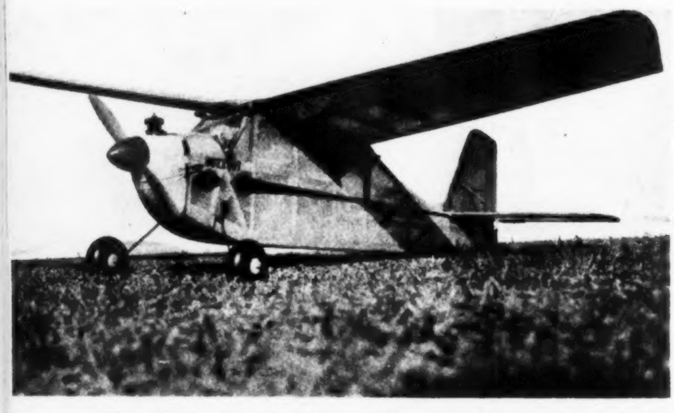
5. Set up three-jaw and cut off the lump on the crankpin with a hacksaw and clean up with a file. Cut off shaft to length and, if necessary, run a die over the thread.

The above may seem an odd way to make a shaft, but the disadvantages are offset by one big advantage. The heaviest cuts are made when the workpiece is strongest and the crankpin will finish up true with the main shaft, without an involved set-up procedure.

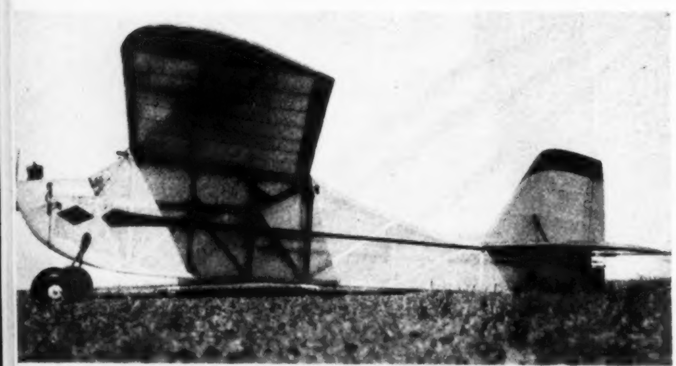
6. The crescent counterweight left by undercutting the crankpin should be filed so that its edge is straight across the shaft center line.

To check all alinement, press the large bearing onto the shaft, using a piece of tube (*Continued on page 42*)

The Buzzboy, a functional 48-inch cabin job, powered by a K & B Allyn .15, was the guinea pig for the tests. For tests, things altered.



Not only does oversized fin area play a part in the mystery, but its effects depend on the angular difference between wing and stabilizer.



For the long-haired thinkers who want to ponder profile distribution, thissa and thatta, this side-view of the rugged Buzzboy reveals all.

MYSTERY of the SPIRAL DIVE

By K. A. WILLARD

All kinds of theories and explanations are offered for spiral dive crack-ups. Finally, actual flight tests pinpoint some reasons.

WHY do so many radio models, which ordinarily fly well, refuse to come out of spiral dives with power off after they reach a certain point, even though opposite rudder is applied?

After losing two models this way, I investigated. The results of the tests proved to my satisfaction that the cause is aerodynamic, not hinging on radio or escapement.

To eliminate the possibility of radio or escapement failure to actuate the controls under high speed load, test runs at 40-45 mph were made in an auto, with the fuselage held in the airstream at all possible angles of attack. The control surfaces worked at all times.

The photos show Buzzboy, a model of functional design which recovers unaided from the most vicious spirals, but if the angular difference between the wing and tail is reduced, up-elevator is necessary before recovery occurs.

The unusual factor is that there appears to be a "critical" setting for each model and if the angular setting is less than that figure, only up-elevator action can save you when you get into a power-off spiral dive. In other words, it seems that it is not a case of having a certain amount of recovery action without the aid of elevators: either you do have it or you don't! I tried Buzzboy with angular settings of 1° (fast!), 2°, 3° and 4°. At 1°, 2° and 3°, recovery from the spiral could only be accomplished with elevator; at 4°, recovery was automatic as soon as rudder was neutral. I was able to reduce the angle to 3½° and still get unaided recovery—but that was the minimum.

Other factors are involved, such as aspect ratio, dihedral, fin area, nose moment, CG location and stabilizer area and placement, but the basic rule seems to be: *to avoid power-off spiral dives, keep the angular difference between the wing and the stab greater than 3½°.*

Related factors to the basic rule are: a. The less dihedral, the greater the angle between wing and tail should be; b. Fin area should be the minimum required for directional stability; c. CG should be in line with or above the CLA; d. The higher the wingloading, the greater the angle between wing and tail should be; e. The lower the aspect ratio, the greater the angle between wing and tail should be; f. A lifting tail requires a greater angular setting to the wing than a flat or symmetrical tail.

So, if you keep the above points in mind in designing your next job, you can save yourself a lot of grief. If your design can't fit into the pattern because you want more speed, then either install elevator control, or *watch out* and don't let the nose get too low in power-off spirals!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FOREIGN NOTES

Big topic all over the modeling world is the 1957 FAI rule changes. How good, bad?

P. G. F. CHINN

Unpopular Decisions at Paris FAI Conference

Reaction to the revised FAI rules, framed by the FAI Model Commission at their Paris meeting last December, has, in general, been unfavorable. Leading contest men in Germany and Italy have strongly criticized the new power loading rules and Britain's SMAE (which Society, it seems, was not acquainted with the agenda prior to the meeting) has requested that the decisions formed be reconsidered. The changes do not come into effect until 1957.

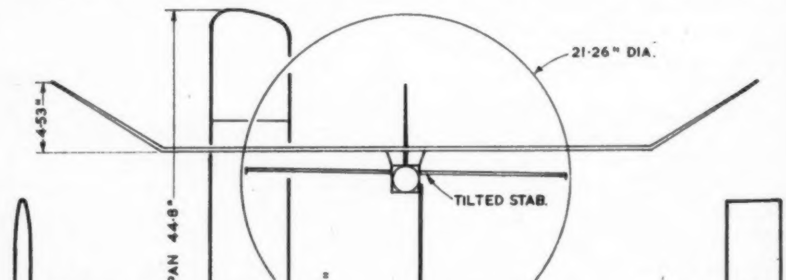
The main scheduled changes are, briefly, a reduction in motor weight for Wakefield rubber class of 50 grammes maximum (1.76 oz.) and an increase in the power-loading for the free flight gas class to 400 grammes per cubic centimeter piston displacement, i.e., 14.11 oz./cc or 231.2 oz./cu. in.-35 oz. for a .15, no less. A further change is the complete abolition of the ROG rule.

Looking at the changes purely objectively and without regard to the feeling of the many International contest men, who, not unnaturally, are apt to be the most vociferous critics, we still cannot see any good reason for making such a drastic change in the free flight gas power loading. The FAI Model Commission should, presumably, be fully alive to all the possible repercussions on International competition and cooperation which their rule changes may initiate. In this instance they do not appear to have been mindful of these obligations.

Firstly, since the FAI's adoption (without too much regard for the U.S., where no such motors were then manufactured) of the 2.5 cc (.15 cu. in.) class motor as the standard maximum displacement for International competition, manufacturers all over the world have responded by developing good motors of this size. Secondly, we have, from time to time, been made acutely aware of the need for keeping the various International class models to compact dimensions in order to facilitate transit from one country to another. Now we find the FAI adopting a rule which could mean the early demise of the 2.5 cc engine, or a spate of oversized models (up to *9 sq. ft.* total area is allowed for a .15), neither of which is likely to increase the popularity of the International free flight model in the immediate future.

Personally, we believe that, if the new loading rule is to stay, the best course for top performance with a .15 will be to tolerate an increase in wingloading, to produce a model of 600-700 sq. in. wing area for the required weight of 35 oz. Some may feel, however, that a 1.5 cc or .099-powered model offers a more convenient solution (21-23 oz.) using, perhaps, 450 sq. in. Still lower down the scale, it is now conceivable that Half-A motors may find their way into International competition, but such models would have to weigh 11.6 oz., although they would be allowed nearly 400 sq. in. *total* area; say, 300 wing and 90 stab.

Winner of the Wakefield event at the 1955 Soviet International Meeting. Had perfect five.



1955 SOVIET WAKEFIELD WINNER

Superb Vickers Viscount, Max Newnham, won Australian Nats scale event. Has metal finish.

Two results are certain with the new rules: (a) they will put an even higher premium on motor performance and (b) they will *not* reduce the luck element derived from thermal activity.

After which rather lengthy discourse, we will get on with the rest of the world news.

Australia: Nationals

Although it had been originally planned to hold the Australian Nationals in another State, it fell to Queensland, at short notice, to organize the 1955-56 Australian Nationals. The week's events took place at Archersfield Aerodrome and the weatherman, on this occasion, was kind. A snag, however, was a nearby swamp and this accounted for about 25 models during the first day's free flight events.

The most impressive model at the meet was Max Newnham's winning controlline scale entry. This year Max, a member of the Toowoomba Model Aero Club, had a superb 6 ft. 6 in. model of a Vickers Viscount of Trans-Australia Airlines, powered by four Sabre .29 motors. The detail and finish on the ship were first class and we hear that TAA have offered Newnham £250 (ca. $700) for the model. To achieve an authentic metal finish, the model (which is reported to have taken 2,000 hours to build), was covered in metal-faced wallpaper. All-up weight, 14 lb.

Free flight exponent Ron Bird of Victoria became Australia's National Champion for 1956. The Junior Championship went to Russ Morrison of Queensland who won the Junior stunt and FAI power (using, incidentally, a Japanese OS .15 motor) and thus obtained a place in the Australian team for the World Championships, as did his elder brother John (fourth in A.2). The State Championship Shield was won by Queensland.

New Zealand

New Zealand is not a very populous country, but it certainly has a very enterprising model firm in the Betta Model Aeroplane Supply Co. which recently opened a new factory at New Plymouth. This was no ordinary opening. It was heralded by a two-thirds-page advertisement in a daily newspaper and included a civic ceremony at which the Mayor of New Plymouth officially opened the building by RC, pressing a transmitter button to unfurl a windsock on the roof. Betta claims to be the largest firm of its kind in the southern hemisphere.

England: Enter Vibra-Matic Induction

Just going on the market is a new British Diesel, the (*Continued on page 54*)

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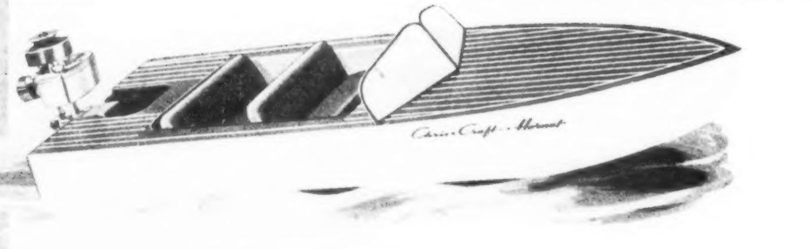

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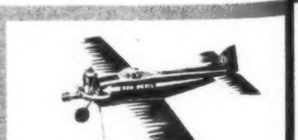

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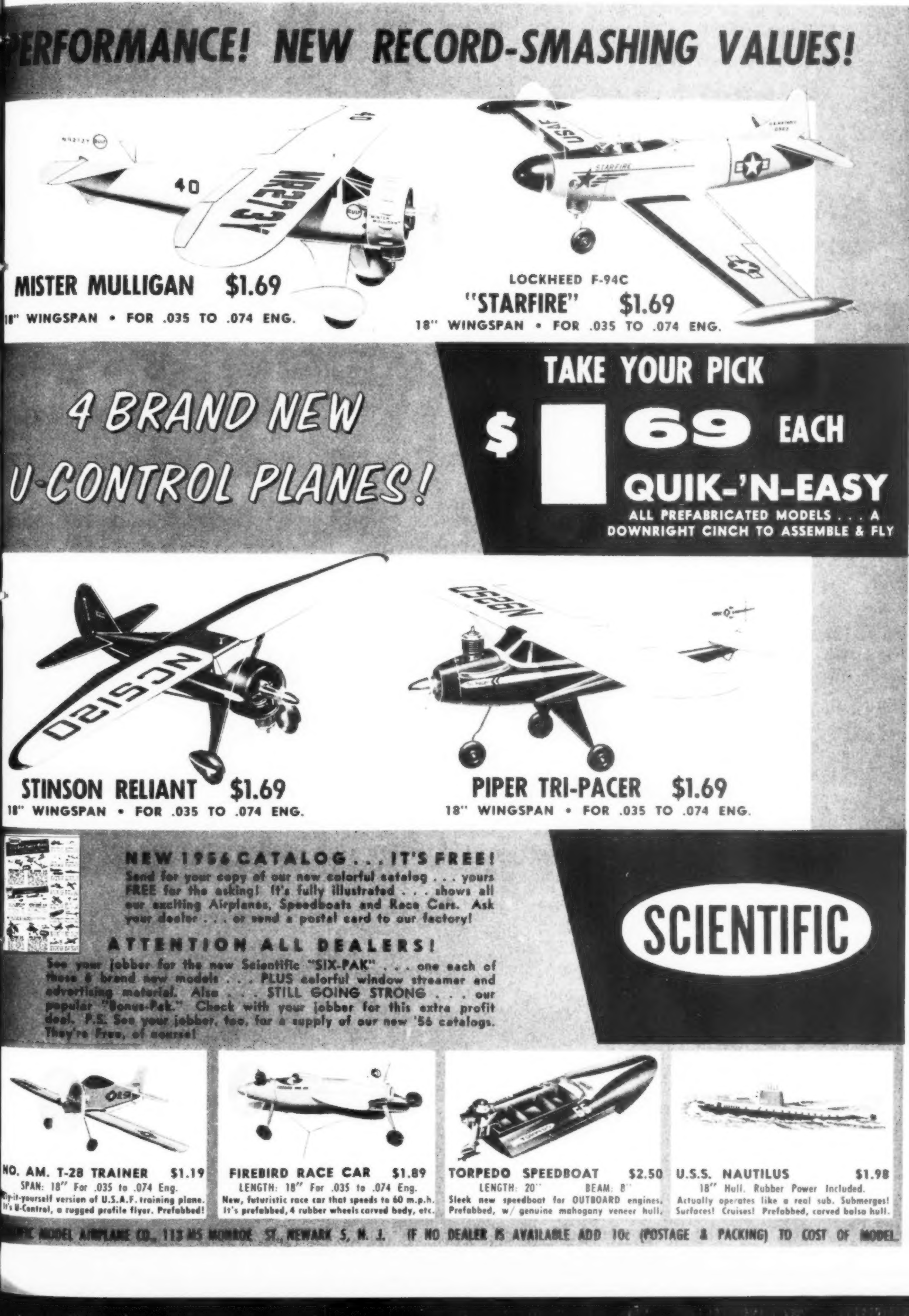
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MAN at Work

(Continued from page 6)

of ties and fly-offs which occur nowadays. Ukie needs new rules but they are in the works.

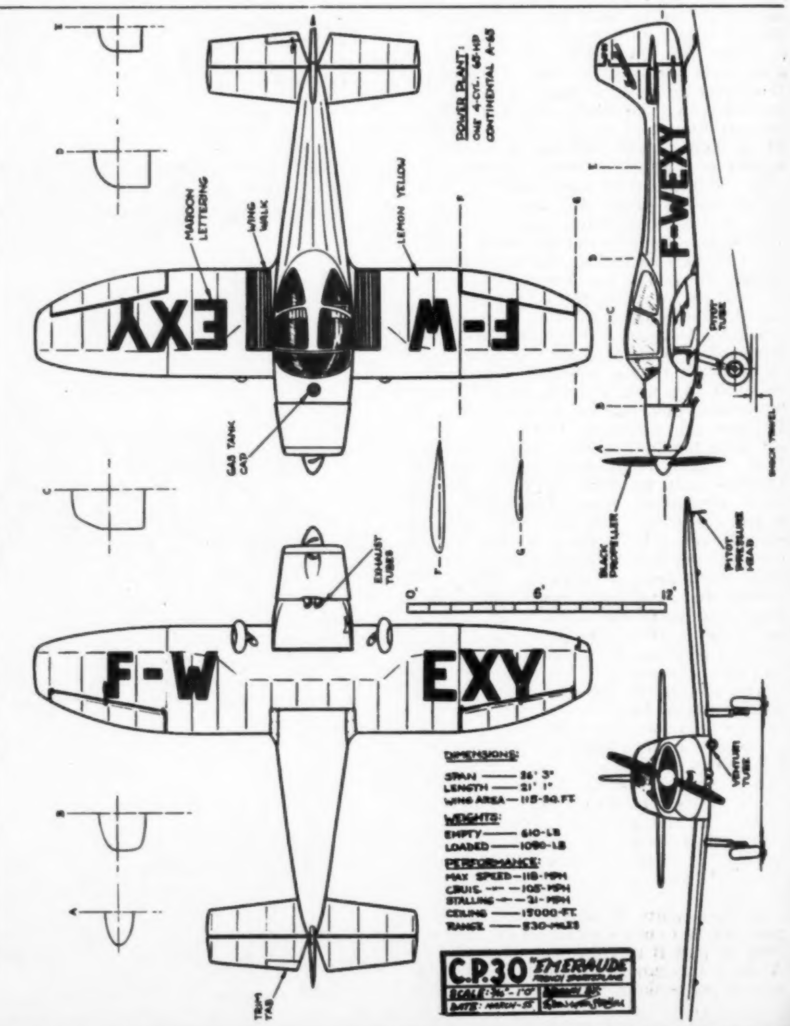
"Don accuses MAN at Work of being sectional," Bill continues, "while he blithely rambles on about why should the small percentage of fliers in the West be governed by the wishes of 90 per cent of the model builders in the country. Now who is sectional? Our AMA organization is set up on democratic principles, is it not?

"Don rashly states the people for heavier loadings are the ones who cannot build light airplanes. I've processed entries at all the free flight meets here and I can state that 91.75 per cent of the models that went by me were brought up to weight with lead, clay, etc. Anyhow, balsa wood is universally available. So, contest flying is not a science?" queries Netzeband. "Seems to me that it has been policy for years to separate the Sunday or sport flier from the contest flier by a wide margin. Although a sport flier does care to build to specifications, he wants to do things as he pleases. The contest flier realizes that rules and specifications are necessary common ground for competition. The contest flier lives to see his creation beat out others who build to the same rules.

"The whole concept of competition is the challenge to turn out something better than everyone else and, when the rules limit the challenge to luck, the whole thing dies at the roots. The thermal cannot be eliminated, but its effects can be minimized. A higher power loading will make possible—in fact, demand—refinements in design. Besides the hot engine and glow plug, what significant advance has been made in free flight since the pylon?" Netzeband wants to know. "None," sez he. "If we are to have true model airplane contests, then we need rules which require a good airplane, not luck and athletic prowess."

Dave Domizi, perennial winner in Carrier, indoor builder as well, hand-launched glider record holder, points up a schism in the ranks of the contest fliers themselves by remarking, anent Don's arguments, "As far as his representing the contest fliers is concerned, the outstanding ones I have known would be outraged. These are people who construct immaculate models—indoor models weighing some .050 oz.; strong, attractive Half-A PL models weighing 4.99 oz., etc. They have felt for some time that the rules needed changing. To them, modeling is a science. Shall we exclude them? They are the people who make the significant advances from year to year.

"They invariably favor increased power-loadings, but are they the ones who cannot build lighter models? So model building is a sport? It's a science, too," declares Dave. "Mr. Alberts sounds like another one of those who would like to abolish indoor events," Dave continues. "These



events are far more of a science than free flight ever will be. Yet indoor events are on the rise. Indoor stick paper covered models drew more contestants than such widely accepted events as A Speed and Wakefield Rubber."

There's the bell—eh, the timer! And hardly started! The FAI boys are hot about the 1957 rules that have their mysterious aspects. John Worth of the Virginia Brain Busters is politely after our scalp for allegedly sharp remarks about the Internationalists. And there's a rematch on this month's discussion. Before signing off until next month, am somehow reminded of the fact that our model industry has long since invaded the domain of the toy industry, which is neither here nor there. But did you know that the Toy Manufacturers of the U.S.A., Inc., state that next year they will sell nearly nine million stuffed toys, including pandas, rabbits and puppy dogs?

Dizzy Boy

(*Continued from page* 19)

The fuselage crutch is made from a finished blank of basswood 15¾ x 2-5/16 x 1 in. Using the pan for a guide, pencil a line around the pan onto the blank. Cut out with a jigsaw or bandsaw, then sand until it matches the pan. Now remove the inside portion of the blank as shown by the dotted lines on the drawing. Now measure 3-5/16 in. back from the front of the crutch and cut a notch 2½ in. long on each side. This notch should be ⅛ in. deep at the front and 5/32 in. deep at the rear. This forms the positive angle of incidence for your wing. The small wing area makes this very important as an extra amount of lift is gained here without appreciable increase in drag of the wing planform.

The elliptical speed wing should be laid out on tracing paper and used as a pattern. Follow dimensions shown on the drawing which are to the nearest 1/32 in. Use a French curve or 1/16 sq. balsa to connect the points. Lay out the left wing and fold the paper on the center line and trace for the right wing.

Select a piece of good quality Northern Basswood or white pine for your wing and cut a block to the required dimensions 20 x 2-9/16 x ⅝ in. Cut out the notch for the control unit and locate points X and Y. Draw a line through these points and cut along this line to form parts A and B. Parts A and B are then spot-cemented together again to allow shaping of wing; when completed, wing must again be parted along line X-Y for installation of control unit. The pattern is now clear-doped to top side of blank. Cut out wing, using the pattern as a guide, then sand around the wing form, removing all the rough saw or cutting marks. When cutting out the wing, allow enough wood for sanding and blending the points on your pattern with a nice curve.

The wing is left flat on top and tapered on the bottom from ⅝ in. at the root section to ⅛ in. or thinner at the tip. After the wing has been tapered, carve the airfoil section, which is ⅔ thickness on top and ⅓ on the bottom. Using a sanding block, shape the airfoil from a lifting section at the root and progress to a symmetrical section at the tip. A slight amount of washout should be sanded into each wing panel, starting 3 in. from the tip.

Remove parts A and B and with a grooving tool cut a channel in the forward edge of part B and the rear edge of part A. Keep this groove centered in the wing section and make it large enough to house

the tubular extension of the control unit. Since the wing tapers from the bottom, the control unit must set at a slight angle. This is achieved by cutting away some wood at an angle on both the top and bottom of wing where the control unit fastens. Slip control unit in place and at the end of the control unit extension cut a notch in part A and part B and a slot cut into the wingtip for the wingtip wire guide. This is made from a brass tube flattened to 3/32 thickness. Using a No. 50 thread, sew this in place to aline with the control unit. Use plenty of cement around this tube and cover with silk.

This is where you will attach your Mono-Line to the airplane. With the control unit in place, adjust carefully so the tubular stem extends exactly through center of grooved passageway. Drill holes through wing and fasten control unit with two 3-56 mounting screws. When tightening screws, make sure that control unit remains set with tubular stem perfectly centered in grooved passageway. With control unit in place, the LE, part A, may be replaced. When cementing, be sure the adhesive does not get into the passageway and interfere with the free movement of the tubular stem. Now drill a 1/16 dia. hole through the wing to receive the bellcrank pivot pin and adjust pin in hole so that cam follower will work freely in groove of cam and solder pin into place on top of unit. Locate wing to fuselage crutch with the left wingtip rotated forward ¼ in. The notches in the crutch may be opened up enough to allow for this rotation. Using a No. 30 drill, drill holes through the wing and fuselage crutch to aline with the bosses cast on pan. Drill and tap these bosses for 6-32 bolts.

Cement wing to crutch and attach both to the pan with 6-32 bolts. Allow the cement to dry. The top of the fuselage is then tapered down and ⅛ medium hard balsa cemented in between the sides of the crutch. Allow for the ¼ thick hardwood piece for the rear tie-down bolt. This should be sanded and covered with silk for extra strength.

The pressure cowl is made from medium balsa. The inside should be sanded smooth and given two or three coats of wood filler, also sanded smooth, then clear-doped and waxed. Two or three wraps of masking tape around the engine cylinder will give the proper clearance when cementing the cowl to the fuselage. Add the pressure baffles inside the cowl, then cover the top and carve to shape. Then cut out for exhaust opening. The front of the fuselage is now carved away to blend with the cowling and spinner. Lay out the stabilizer on 1/16 or 3/32 birch plywood and cut into at the centerline. Cut the elevator from the left stab and recement the two halves, covering both top and bottom at the center with silk or gauze. Cement this assembly on a 1/16 thick plywood platform and fill the sides with cement or plastic wood. Make the elevator control horn from a Veco part and sew this to the elevator and cover with silk. The loose end is held in a short brass tube pressed into a hole drilled on the opposite side. Insert the elevator in place and apply cloth hinges.

After the tail assembly has been completed, locate on pan and attach with two 4-40 bolts. The pushrod can now be made from 1/16 dia. wire. This will have to be exactly the right length so the elevator will be in neutral. The pushrod will have

to be detached from the elevator horn each time the top half of the airplane is removed.

The original Dizzy Boy was finished with three coats of Aero Gloss Metal primer and three coats of yellow fuelproof dope, wet-sanded and rubbed out with finishing compound, then waxed. The weight of the model should come out around 30 oz. with fuel and should balance level one quarter back from the LE of wing. There isn't much we can do to the new McCoy .60 to increase power greatly. However, the engine can be cleaned up and reworked to give a steadier power output with hot fuels, during a flight.

First, completely disassemble the engine and remove the cylinder liner from the cylinder. This can be done by heating the cylinder around the sides, rotating it over an open flame, such as the burners on a kitchen stove. Do not overheat the cylinder as the sleeve will come out quite easily if pushed from the bottom with a blunt tool.

With a small square Swiss file, shape the intake ports until the webs are square. Then file only the top and bottom of the ports to remove any roughness and to allow polishing. The bottom edge of the intake ports is then chamfered at 45° until there is a 1/32 in. wide edge left on the port. File a small radius around each web in order to streamline them for the incoming fuel.

The two round bypass ports should be made ¼ in. sq. and the piston ports filed to match. You will note the bottom of the sleeve is chamfered on the inside. On the bypass side of the sleeve, file the bottom of the sleeve until the chamfer is gone and this becomes a sharpe edge; then file a radius on the outside of the sleeve just underneath the two bypass ports and only as wide as the bypass itself.

The exhaust ports are filed in the same manner as the intake ports except that the bottom of the ports is not chamfered. All the ports should be polished and light filing should remove all burrs left on the inside of the sleeve around the ports.

The sleeve may be replaced in the cylinder by heating the cylinder as before and slipping it back into its original position.

The front cover may be disassembled and the bearings washed in a clean solvent. The hole through the front cover should be brought to a high polish and all parts washed clean before assembling.

The rear cover may be disassembled and the TE of the port in the rotor should be chamfered on the side which is next to the backplate. This prevents the rotor from catching on the shim and turning it out of position when the engine is being run. When replacing the rotor, put a thin film of Molycote or Rev-Up between the rotor and shim. This will help polish and seal the rotor.

The top of the piston should be cleared of burrs and then polished. If the piston rings seem tight in the ring grooves, they should be removed and lapped down on each side until they rotate freely. The connecting rod may be filed smooth and also polished.

Before assembling the engine, be sure all parts are clean and a few drops of Three and One oil go on all the moving parts. Put your engine together securely and do not disassemble it unless absolutely necessary. When flying your Dizzy Boy, always try to set your needle valve on the rich side to prevent engine overheat-

ing. Also, run the engine only when flying the airplane and you will be able to keep a closer record of the running time and varying speeds of your model, which will help you determine the engine peak to count on for some future contest.

One of the most important articles in speed flying is the dolly. Follow dimensions shown for construction. Wrap each joint with wire and solder. The wheels shown are best for any take-off surface although, before flying off asphalt, two wraps of Scotch tape should be put around the inside wheel. This will tend to let the dolly slide or track around the circle. Add some extra weight to the outside of the dolly to insure its torque resistance on take-off.

Test-fly your Dizzy Boy with good clean fuel, such as Supersonic 1000. Fill your pressure tank sufficiently to get in a few laps with a rich run on your engine. Insert the controlline connector loop through the wing tip wire guide and hook to control unit connector button. Operate your control handle and check for smooth and sufficient elevator travel, which should be about 10° up and 10° down. If the controls seem erratic or do not operate, check the complete control system for any bind or rubbing. A drop or two of Three and One oil on the control cam will help.

Flying Mono Line speed may appear difficult but you will be surprised how easy it is after you have flown two or three times. Dizzy Boy is very stable during flight and, if you have taken all the precautions to insure smooth operating controls, you won't have much to do but hang on.

To open up Dizzy Boy for a contest or record attempt, use a new glow plug and This Is It fuel or your own brew, if preferred. A 9-12 Tornado propellor can have the pitch increased slightly the full length of the blade except the last inch of each tip, where the pitch is slightly decreased. Smooth-sand and wax the whole blade.

Here's wishing all of you who build Dizzy Boy a lot of fast flying and plenty of happy landings.

The MAN .19

(*Continued from page* 31)

on the inner race and, having oiled the crankcase housings, press the shaft and bearing gently into position. Check that the shaft spins freely and then insert the small bearing, using pressure on both races if possible. If the crankcase was correctly fitted on the mandrel and did not move while cutting, the shaft should now spin freely. Any slight "lumpiness" can be eliminated by carefully tapping the bearings or shaft.

The keyway can only be cut by milling and, if possible, should be used in preference to the following alternative, as it is ultimately easiest to make and does not materially weaken the shaft. However, if facilities are definitely not available, a flat filed on the ¼ in. dia of the shaft, starting 3/16 in. from the shoulder and giving a final measurement of 3/16 in. when gauged in terms of shaft thickness, will do instead.

Prop Driver

Machining of this component is straightforward and where the keyed drive is used, the keyway may be easily filed by hand to suit a McCoy Redhead key. However, if flatted shaft drive cannot be avoided, the prop driver should be drilled ⅛ in. through the center and the hole then filed out to suit the shaft. By filing the flat side of the hole first and then cutting the remainder to suit, a concentric fit can be

achieved with a little care.

Cylinder Head

Little need be said of this part, other than that the bottom edge must be faced on the same set-up on which the thread is cut, to insure even pressure on the cylinder flange when tightened.

Wrist Pin

From 3/16 in. dia stock drill rod; the radiused ends should be polished with fine emery paper after drilling.

Cylinder

1. Chuck material remaining from crankshaft in three-jaw and drill, bore and ream, with fine feed and lots of oil, to 43/64 in. dia. Turn up mandrel to suit and complete machining of component, lightly chamfering top and bottom of bore, making exterior of upper portion to a snug slip fit in cylinder head. Mark exhaust and bypass centers circumferentially with a fine tool point in lathe. Complete radial markings in lathe, using dividing headstock if fitted, or using chuck jaws as guide if not so equipped. Remove mandrel from lathe and use as means of clamping in vise, etc., while drilling ports.

2. Exhaust ports are produced by drilling and filing. Therefore, make appropriate center pop marks and drill series of 1/16 in. holes. Similarly, drill ⅛ in. holes for bypass ports. Remove work from mandrel, and, using 1/16 in. drill in each of exhaust holes, carefully waggle drill sideways in order to break through each hole in such a manner that a small hacksaw blade or point file can be inserted. Patiently file ports to drawing.

3. Having completed the exhaust ports, put a ⅛ in. drill through each bypass port in turn and, observing the inside of the bore, carefully incline the drill in such a manner as to slant the holes upward until their top edges are .025 in. below the lower edge of the exhaust ports. This is much easier than it sounds and can be gauged quite accurately by squinting through the opposite exhaust port. A final, though not essential, refinement is to file the upper edges and sides of the bypass ports square, to increase initial opening area.

5. You have the choice of using the cylinder liner soft or case-hardened. If possible, have it carburised for a half-hour in a cyanide bath and quenched in oil, having first removed all burrs inside and out from port cutting.

6. Finishing the bore round and parallel can take a variable amount of time depending on the smoothness of the reamed finish. During hardening, the bore may distort slightly and finishing may take a considerable time; however, the smallest automotive machine shop usually uses Sunnen honing equipment for fitting wrist

pins and, if approached in the right way, the man in charge will have a hone run through the bore in return for a look at the engine when completed. That is the way it worked for us and a few minutes spent in describing the mysteries found an amused and interested listener who did his best to produce a good job. The Sunnen principle, with a little care, produces a dead round and parallel hole and it is no exaggeration to say that the model engine industry was made possible by this machine.

7. Either after honing, or straight from reaming, the bore should be lapped to a mirror finish. A piece of [illegible] in dia copper, brass or soft aluminum about 1 ft. long should be chucked, centered and supported by the tailstock and turned to a snug slip fit for the cylinder bore. Cut a series of shallow grooves 1/32 in. wide, about [illegible] in. apart, along its entire length and remove resulting burrs. Coat the lap with fine lapping compound and, running the lathe very slowly in back gear, move the cylinder back and forth along the full length of the lap until a high uniform finish is obtained. Try not to exert any tilting pressure on the cylinder with the hand. Finish the surface with a mixture of oil and metal polish or rouge, having first cleaned off all compound from cylinder and lap, until the bore is mirror-like.

1955 Nordic Winner

(*Continued from page* 14)

1/16 in. of them penetrates the surface of the plywood template. After you have pressed the piece of balsa against the plywood rib, it is easy to cut the balsa to follow the plywood shape with a razor blade or an X-Acto knife.

In order to keep your angle of incidence the same on both wings, you should cut your connection ribs W.1 to W.2b very carefully. It is best to place all connection ribs on a piece of 1/3 in. plywood before sanding them to exact shape.

The next step is to shape the side pieces for the LE and TE, splicing them to the straight pieces. While cutting rib slots into the LE and TE, repin the sections of both wings to insure symmetry. Both TE's can now be completed, while the LE's should be finished only roughly for the present.

For wing assembly, fasten TE on a level wooden board so that only the rear of the TE touches the board while the front stays 13/64 in. away from it. Now put the ribs in place. Cement the LE to them afterward. To avoid breaking the ribs while positioning the pine spars, support ribs by placing a strip of wood underneath them, at center. This leaves a number of finishing details: cementing the supporting triangles into place, sheeting over the first three rib sections, and other indicated parts of the process. After you have neatly sanded the wing sections, both sections should be kept on the level wooden board until completion of the fuselage and tail assembly to work out any possible tension created during construction.

When you start the fuselage, first build the tailboom, consisting of F.5 to F.7. After cutting the four balsa strips F.7 to shape, cement them onto F.6; clamps should help keep them in place. Attention should be given to F.6, since possible bends here cannot be smoothed out later. After cementing side-parts F.5 in place (also with the help of clamps), you have completed the tailboom. The front part of the fuselage follows. Beginning with the plywood middle piece, F.1, cut and shape and then use it as a pattern for shaping the two balsa pieces. Then chisel openings in the balsa parts. Before cementing together the three parts, remember to cement a piece of lead from 2 to 8 oz. into the opening of the plywood middle piece. Now the tailboom should be neatly cemented to the front part of the fuselage.

With the help of steam, bend the ply-tongues, F.4, along the lines indicated on the plan and cement to them connection ribs F.3. For the remaining pieces to be added—stabilizer, connection piece, rudder fin, fill piece—use only light balsa of good quality. When they have been completed, cement them to the tailboom.

After the fuselage has been sanded, cement the tow-launch hook in place, preferably with a good cellulose cement. It will not be very difficult to build the auto-rudder blade, including the little parts that accompany it. It is easy also to pull the string, which will later work the auto-

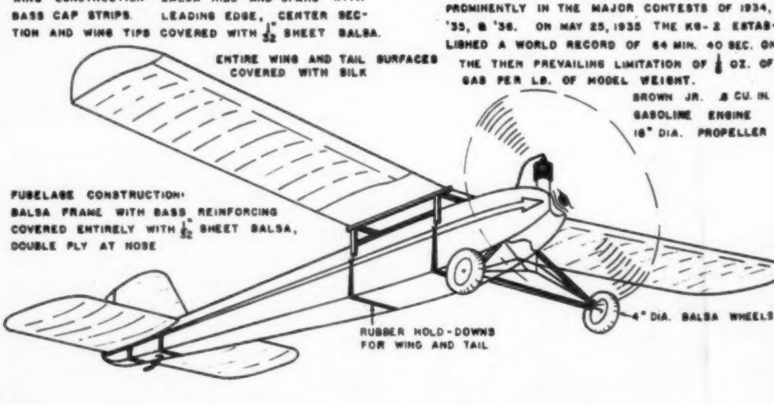
MODELS THAT MADE HISTORY

BY J. L. MACKENZIE

KG-1: SPAN - 8'-0", CHORD - 15", AREA - 1384 SQ. IN., WGHT. - 7 LBS.
KG-2: " 10'-0" " 15" " 1744 SQ. IN. " 6½ LBS.

WING CONSTRUCTION: BALSA RIBS AND SPARS WITH BASS CAP STRIPS. LEADING EDGE, CENTER SECTION AND WING TIPS COVERED WITH 1/32" SHEET BALSA.

JOSEPH KOVEL BUILT AND FLEW THE ORIGINAL KG-1 AND KG-2 IN 1933 & 1934. THEY FIGURED PROMINENTLY IN THE MAJOR CONTESTS OF 1934, '35, & '36. ON MAY 25, 1935 THE KG-2 ESTABLISHED A WORLD RECORD OF 64 MIN. 40 SEC. ON THE THEN PREVAILING LIMITATION OF ⅛ OZ. OF GAS PER LB. OF MODEL WEIGHT.



THE K-G GAS MODEL

THE KG WAS DESIGNED BY CHARLES H. GRANT, AERONAUTICAL ENGINEER, AUTHORITY ON MODEL DESIGN, AND EDITOR OF MODEL AIRPLANE NEWS AT THAT TIME. IT WAS THE SECOND SUCCESSFUL GAS MODEL IN THE U.S. AND GAINED A REPUTATION FOR STABILITY.

THE FIRST PLANS FOR A GAS MODEL TO BE WIDELY DISTRIBUTED WERE THOSE OF THE K-G APPEARING IN MODEL AIRPLANE NEWS, APRIL & MAY 1935. MANY K-G MODELS WERE BUILT AS CLUB PROJECTS AND PLAYED A VITAL ROLE IN MAKING GAS POWERED MODEL FLYING POPULAR.

rudder, through the tailboom, if a steel wire is used. Fasten the string to the steel wire; then run the steel wire into the front hole. Push it through the tailboom and through the rear hole until the string has been placed correctly.

For the tailplane, cut templates in the shape of T.1 and T.2. Put 12 balsa pieces between them and fasten them together, side by side, with pins, and shape and sand them to a uniform outline. After shaping the ribs properly, place in them the cut-outs as spars. To build the second half of the tailplane, simply reverse the procedure by placing templates the opposite way to give the right slant to the ribs. The cut-outs on the LE and TE of the tailplane should be handled as on the wing section—always together. After both TE's have been sanded, assemble both halves of the tailplane. While cementing the TE's into place, make sure they follow a downward angle, agreeing with the rib shape. These edges should not point straight back or bend upward. The LE should be sanded to a point. After cementing both halves to T.3 and T.4, position steel wire arches. Covering the first three rib sections with balsa will add to the stability of the tailplane and will give it a longer life.

This brings us to the finishing. Medium Japanese tissue covers the wing while the tailplane takes light Japanese tissue. After the tissue has been placed, wet it lightly with water. Wings should be kept in fixed position until they are dry. Wings and tailplane should then receive three coats of clear dope. As soon as this has dried, the wings should be returned to a fixed position on the board. The wings will not distort if they are left on the board long enough after application of the last coat—at least a day. The fuselage should also be covered with three coats of clear dope. Then, for best results, all parts take one coat of colored dope in the builder's favorite color.

Now you are ready for final preparations for flight. The CG is 3-9/16 in. away from the LE of the wing, toward the rear. Put a pointed object underneath the model at the CG position and fill the ballast chamber with lead until the model balances levelly on this point. If the model should still weigh less than 14⅜ oz., insert lead into the fuselage somewhat forward of the CG. Then close the trim chamber.

And so the model may be hand-launched. If it still needs any trim weight, note that the tail can be trimmed to suit by adding shims; add balsa to the under-front or under-rear portion of the tailplane. Do not change over to the tow-launch unless you are convinced that the model performs in the expected way during hand-launch. You should trim your model now for high performance flights and concentrate mainly on obtaining the desired turns. After having turned a half-circle—or 180°—the plane should level off and keep its course. It will take some time to find out how to trim the plane during different weather conditions. It may mean many trips to the launching site.

Do not forget a very important item: the dethermalizer. Many good models have been lost just because the launcher forgot this "thermal brake." The fuse burns through the rubber which is fastened to the rear of the tailplane, allowing it to pop. The cotton string has to be lighted as any other fuse is, so that the model comes down in either a fully stalled attitude or in spirals, without sustaining any damage.

MOVING???

we need your former address as well as your new address

Radio Control News

(*Continued from page* 21)

screen is then brought directly to the B-plus connection. Harry uses the car battery for filament supply and also has a power supply built around a Merit P-3176 transformer, which supplies 300V at 160 ma for field use, or 117 VAC for bench testing.

Frank Schwartz, 204 Sixth Ave., Nashville, Tenn., reports that he has rebuilt a drone target receiver into a compact, miniaturized unit weighing about 1 lb. Smaller relays were used and a 1U5 was used in the front end. Other changes were made in order to reduce the current and voltage load. His problem is in finding a plane to carry this receiver plus about 2 lb. of servos and batteries. When this reaches the newsstands, Frank will probably be well along with a 9-ft., twin-ruddered, prewar Berkeley job. As soon as he does a little more field checking with the converted drone receiver, we'll try to get you some information on it. A unit such as this is ideal for larger boats or cars.

JUST NEWS

All individuals and groups interested in radio control flying will be interested in the Fourth Annual Great Lakes Regional RC Meet to be held at the Selfridge Air Force Base, Mich. (15 miles northeast of Detroit) on August 17-19. Ernie Kratzet, Box 5197, Grosse Pointe 36, Mich., supplies us with the date on this excellent annual event. Much time was spent in arriving at a program for this meet, which will allow the novice and average flier to fly in the same contest with the experienced flier. A quick run-down of the event shows that everyone must put in a qualifying flight before being eligible for the championship flight. The flier must be ready to fly within three minutes from the time the preceding flight lands. Air time is limited to six minutes and each ship must gather in 48 out of a possible 81 points to qualify.

Once you do qualify, you may enter the championship flight class, which allows you two minutes to get into the air from the time the preceding flight lands. Air time is seven minutes and some of the maneuvers listed are: inside and outside loops, inverted flight, power dives, Cuban eights, horizontal rolls. Bonus points may be picked up by doing vertical eights, knife edge flights for 200 ft., inverted rectangles and many others. Needless to say, the boys in the Detroit area are no amateurs; but as we said before, provisions have been made for the novice flier.

Ted Strader, 821 North St., Mt. Vernon Ill., has some interesting comments on the FCC registration affair. Ted has started quite a few local boys in RC work by building a common transmitter. In this way a beginner does not have too much expense and the problem of a stray signal on the flying field is minimized. He urges all of the fliers, even though they do not own a transmitter, to write to the FCC for support of a new frequency. Ted feels that the plugging we've put in the column, regarding FCC registrations has paid off—at least, we hope so. While on this subject, we might mention again that the FCC *did not* give the modelers the 27.255 mc spot. This spot frequency was permitted to be used on a "trial" basis and it was allotted to other users of remote control devices. **In the meantime, send in your FCC registration form, whether it be for 27.255 mc or 465 mc.** Let's not get on the wrong side of the FCC and lose everything we have.

We've long heard rumors of the work being done by German RC builders and fliers. Now we're getting some actual proof of the fine work they do. A photograph shows the 80 in. RC job by Harald Kurth, Bremen-Schwachhausen, Im Deepen Pohl 2, Germany. This model powered by a 10 cc engine won second place in the single-channel event at the International contest held at Essen-Muhlheim, Germany. Lest you think that the picture of the flight line was taken at a local contest, remember that model building the world over produces a common bond. Taken at the German Nationals, the model in the foreground is by H. Chech and uses an English receiver with a Bonner escapement. The Cessna model was built by a Mr. Lichiuns and is said to be an excellent flier.

It might be a good idea if you joined the AMA and took advantage of their insurance plan. This plan now covers damage done in the course of flying at a time or place other than a sanctioned meet. Of course, this does not mean that the necessary safety precautions should be thrown to the winds. From E. L. Rockwood, Secretary, Pacific Radio Control Society, Menlo Park, Calif., and anent the subject of insurance: members of the International Radio Controlled Models Society, U. S. Branch, may obtain liability insurance for $2.50 per year, with coverage for model work anywhere in the world at any time. Includes property damage up to $5,000; bodily injury, $50,000 to $100,000; cross-liability between modelers and parent liability for minors. Covers all types of model activity: planes, race cars, boats, etc.

While on the foreign theme this month, we have more news of planes from Europe. Mr. E. Kreulein, who sent in the very fine description of the pneumatic servo system, showed us a photograph of his 60 in., 2.5 cc Diesel-powered RC job.

Radio equipment consists of a three-reed sub-miniature receiver which controls rudder, elevator and engine speed. Rudder and elevator controls are accomplished with a self-neutralizing electric motor actuator.

Another photograph accompanying article shows the Swiss team of Schenker and Fischer. The 9 cc Diesel-powered plane utilizes the Stegmeier pneumatic servo system. This model appears to be about 8 ft. and is said to fly quite well.

How about the FCC registration? Do you have yours in yet? Whether you fly in 27 or 465 mc, you *must* register with the FCC. There's no pain involved, so let's go.

NEW ITEMS

New items this month include a variety of products to make your design work easier and flying more reliable. Although our first item has been mentioned in a previous column, we'd like to announce a new addition to the DMECO positive flow fuel tank line. The deBolt Model Engineering Co., P.O. Box 73, Williamsville, N. Y. has a 4-oz. capacity tank, giving a 10-minute run with a .29 engine. The 2-oz. model sells for $1.59 and the new 4-oz. size sells for $1.69. These tanks feature positive fuel feed from tank to engine, no matter what the attitude of the plane might be.

Ace Radio Control, with headquarters in Higginsville, Mo., can now give you better-than-ever service through their two new branches. The East Coast distributor is located at Box 1661, Burlington, N. C. The West Coast distributor is Marconi at Fair Oaks, Carmichael, Calif. New items in the Ace line include sub-miniature capacitors ranging in value from about 10 mmf up to .04 mf. Prices: 15 to 20c. These are quality sub-miniature items. They are also stocking crystals for use in the 50-54 mc band. Used in overtone and doubler circuits, the two stock items will hit 51 and 52.5 mc and the price is $3.65 each. These are mounted in the FT-type holder and crystal sockets are also readily available.

Gyro Electronics Co., 325 Canal St., New York City, has a 10-position stepping relay which operates on either 6, 12 or 24 volts. The 6 and 12V models sell for $9.95 and the 24V models, for $8.95. We've had many inquiries for such an item to be used in boats or cars and now we have a source for it at a reasonable price. Also from Gyro comes the receiver shown. A transistorized version of our two-tuber, this 2 oz. unit comes encased in a plastic box, draws about ⅜ ma when idling and the relay current rises to approximately 3 ma upon receipt of a signal. Completely built and tested, this Model DX receiver sells for $19.95, including the installation kit.

The International Crystal Co., 18 N. Lee St., Oklahoma City, Okla., markets an oscillator which may be used on 27.255 mc or in the 50-54 mc band. In kit form, less tube and crystal, the price is $3.95, wired and tested and with tube; less crystal, the price is $6.95. In the opening section of this column (Hillman schematic), we show how to hook this oscillator to an amplifier.

Again we want to mention the reed relay Model AR-3 by CG Electronics of Albuquerque, N. M. This unit has been mentioned in the past in this column but since there is quite a bit of interest in multi-channel equipment, especially reeds, here's another reminder of a mighty compact and lightweight unit. Occupying less than 1 cu. in. of space and weighing less than ½ oz., this reed relay has a minimum driving voltage of 2½V (rms) and the frequencies are between 100 and 500 cycles. Price is $12.95. How about that three-channel Half-A model you've been dreaming about? The Jaico GEM relays are ideal secondary relays for this unit.

Babcock Radio Engineering, Inc., P.O. Box 3097, Van Nuys, Calif., is really in the model RC field to stay. Their Babcock Super Compound Escapement has been improved to a point where any malfunctioning through vibration is non-existent. The magnetic circuit is claimed to be the most powerful available. This escapement gives you left or right rudder when you want it plus up-elevator or an electrical contact for auxiliary controls. The new model, the Mark II, is available at all dealers at no increase in price over the original $7.95.

The next item from Babcock is known as the Universal Motor Escapement. This escapement, for the first time, offers the model builder a complete motor control unit and includes the air bleed valve and actuating rubber motor in one package. This unique escapement may be used as a mechanical actuating device for clapper valves, exhaust controls, or as a simple two-position rudder or elevator escapement. The price is $8.95. The third and last item from Babcock is an airplane kit designed by R. E. Schumacher, Consulting Engineer for the firm. This 42 in., Half-A RC job, known as Breezy, Jr., is a realistic job with over a year-and-a-half of testing behind it. Complete with die-cut parts, lightweight Hillcrest wheels, torque rods, etc., it sells at $6.95. Having built and flown many of Dick Schumacher's designs, we know this will really be a popular model with the beginner and expert alike.

Notes on Multi . .

(*Continued from page 24*)

the conditions that "sabotage" the proper functioning of the receiver. The chap accustomed to single-channel carrier operation—as we had been—will think here of batteries. But, like workmanship, the proper selection, care, installation of batteries have to be assumed. The builder ought to know what a given set of batteries will do for a given number of flights, allowing for rest period lengths and the temperature (is it cold in the north?). If he doesn't know, he should find out— *now*. Make a series of rundown tests—outdoors in the cold, if it is cold!

Rather than batteries, we refer to bonding and the suppression of potential interference from the interaction of metal parts. Bonding, or the grounding of the system, when a sensitive tone receiver is used, is absolutely essential and Babcock is quite specific in its directions. The rattling of a linkage in the wind sometimes is enough to foul up a single-channel receiver and, even in cases where bonding is not said to be required, one or more channels of any equipment may be affected by vibration of a motor control pushrod or some other obscure condition. Ground everything, then forget about it. The need for bonding can be reduced throughout the system and in tricky places by the elimination of metal-to-metal rubbing surfaces, as was done here with micarta horns and metal rods, micarta elevator bushing support, etc.

Noise, as the sources of interference within the machine itself are concerned, can come from many sources. One offender that is often overlooked is the wing platform. To reduce drumming, it is advisable to rim the cabin top with rubber or some other suitable material, such as rubberized insulation matting. This also serves to cut down on exhaust leakage into the cabin.

In the field of medicine, it has been observed that advances made in the control of one disease shifts some other disease to the top of the problem list. The same thing happens when an advance is made in radio control. Only a few years ago it was a problem to get a receiver that worked. When the receivers improved, escapements and relays became a pair of well-matched evils. Both relays and escapements keep improving. In the Babcock with its sealed relays, the relays, as well as the receiver, are conducive to good operation and abortive flights, however few, are more apt to result from actuator causes than from anything else, regardless of make.

Escapements and servos both have critical features, so this discussion definitely should not be regarded as a recommendation for one over the other. The control system used in the tests involved rudder from a compound escapement, which also worked a second escapement for either a single air bleed type of two-speed, or the Bramco throttle and the Babcock trim servo (see Mar. '56 issue for three-views of three ships). The accompanying drawings show the details. Let's consider the rudder escapement.

Both Babcock and Bonner compounds have been used. With the Bonner it was confirmed, for other people have covered this ground, that a balanced rudder was essential, particularly with heavier and faster airplanes. The percentage of balance area and its disposition were altered three times to achieve the rudder shown. In the beginning there was no rudder control because of blow-back or "air loads." Properly balanced, the rudder can be operated satisfactorily with the Bonner. Although we had used Bonner compounds without trouble for a long period of time in other ships, two different escapements gave trouble in the action of the toothed wheel and the rattle, occasionally sticking. Bonner subsequently changed the mounting of the rattle and that troublesome point has been eliminated.

A disturbing tendency of the escapement to malfunction in cold weather finally was traced to a bonding wire which was soldered to the torque rod. Although light and flexible, this wire did have plastic insulation which stiffened in the cold. The same bonding wire had attached to both elevator and rudder control rods—but this was altered to the arrangement that is shown in the drawings.

The Babcock escapement, on the other hand, using ¼ in. rubber, has plenty of muscle for moving a rudder and it may be that no balancing is needed: Babcock reports that this balancing is unnecessary. But on the second and third ships, rudder-walking took place at certain low rpm's and again at high rpm's as the ships pulled up from a dive. Babcock now has modified the escapement, mentioning that vibration effects have been eliminated. In winter weather, temperatures well under 20°, the elevator trim servo had a tendency to stick in any control position. This was traced to the effects of low temperatures on plastic electric motors; presumably, the distances between shafts changed enough to create excess contact pressure of the gears. The trouble was easily corrected by placing a thin shim between motor and base. Incidentally, it took one month of abortive flying sessions to figure out why controls did not function freely outdoors but would work beautifully indoors.

Because the trim servo draws quite a bit of current when it runs against the stop and because the flying was to be done in cold weather (which is tough on batteries), it was desirable in our case to shift to 4½V on the servo rather than use the normal 3V. The higher voltage gave more margin before minimum operating voltages were reached under the heaviest running loads. Use of 4½V (we knew about this but thought we were getting away with it!) throughout the actuator system eventually magnetized the rudder escapement.

Residual magnetism is hard to put your finger on; it increases with pulsing (you pulse a compound for two and three), then dies away. It is first manifest in slowed-down keying speed in order to get two for left and three for engine, if set up that way. The compound should normally work that, no matter how fast you key, you cannot go too fast—but you can go too slowly! When residual magnetism affects the compound, left rudder (if it takes two blips) keeps coming out as right rudder. Because of this 4½V goof, one airplane was washed out. Afterward, a resistor in the actuator circuit dropped the voltage for the escapement to 3V. From three medium cells, the servo gets the full 4½; the escapements, the 3. This arrangement gives such good results for both types of actuator, that it is recommended.

Still in the actuator compartment, here's the engine two-speed escapement, a Bonner SN. When used with the single air bleed, the standard Bonner motor escapement with control air valve was employed; Babcock more recently announced its motor control escapement.

Unfortunately, fuel consumption on low motor is sky-high with any two-speed system that varies only the amount of fuel intake. A single Walker pressure tank is completely inadequate and twin tanks would give only moderate flights if much two-speeding were done. On the Coast, the trend has been to use as many as four such tanks. This must be a joy to the fuel manufacturers but it is an awkward problem to the RC man.

For such reasons, the Bramco throttle was finally installed. This throttle varies air and fuel both and it is felt that two Walker tanks would be adequate. Like the Mills throttle, the Bramco does involve twisting of the fuel line tubing when the throttle operates. In our case, the motor control escapement then required overwinding of the rubber to insure throttle operation. The escapement will work the throttle but a servo can also be used. However, we've had no experience with servos in this instance (with the Babcock receiver) that, being self-neutralizing, require use of the lower contacts of the relay.

The receiver mounting was the utmost in simplicity. Slabs of foam rubber were placed on the four sides and beneath the receiver. Two sets of hooks on each side of the receiver allowed rubber bands to hold the receiver in place. Strong bands that are not stretched far are better than weak bands stretched tightly. Eventually, did change the cable plug but not socket on the receiver, although it is not necessary to do so. (If a thin cord loop is made for the plug, it can be pulled from the receiver as often as necessary without pulling loose a lead.)

Yet the amount of testing being done with one receiver in a succession of ships did suggest a more substantial arrangement. Apparently, nine-pin plugs were not easily come by; at least, it is hard, if not impossible, to buy them from regular sources of supply. But seven-pin sockets and plugs are generally available from radio supply houses in the model field. A standard nine-pin tube socket was modified by removing the saddle or metal face and inserting and soldering pins into each hole. The pins were obtained from a couple of the seven-pin plugs referred to. The pins should extend 3/16 in. beyond the face of the plug to fit properly in the socket.

Although no difficulty from microphonic tubes was ever noticed, it is understood that the factory has since put rubber grommets around the tubes to prevent direct contact between the envelope and the rim of the holes in the receiver can. One tube was cracked, presumably from some moderate bump, because the only violent banging around the receiver was subjected to did no damage. This is mentioned by way of explanation for the masking tape wrapping placed around the tubes in the installation in the last of the three airplanes. The procedure was not forced upon us, may not have been necessary, but appeared to be a precautionary thing.

The principal difference between the wiring in this airplane and the more familiar single-channel jobs is that the wiring is not done in the airplane and does not have to be a permanent part of the airplane. The manufacturer's directions give excellent advice on cabling the harness of wiring. This harness can be prepared and tested on the bench, then dropped into the ship. It is advisable to perform all installations and wiring connections before the fuselage is covered.

Speaking of noise and the strange things that occasionally plague the man

who does a lot of flying, the use of earphones is a revelation. Not only do you hear the crackle of "noise" from things in your own ship, especially with the motor running (eliminate them!), but you also hear some carrier-wave transmitters being switched on when they are keyed. They emit a swiftly rising tone that can trip a relay on the tone jobs and throw you off a sequence, if you are using a self-neutralizing escapement. It is anything but reassuring to find that some people's receivers definitely put out stronger signals than their transmitters. This is fact, not whimsy.

It is hoped that these fragmentary experiences will help the newcomer to multi-channel to have a perspective of its requirements, particularly when viewed alongside other material published or to be published in the near future.

Grumman Cougar

(*Continued from page* 10)

metal thrust deflector is next installed in the aft end of the fuselage by slitting the paper as necessary and recementing.

15. Fuel tank filler and vent lines made from 1/16 dia. aluminum tubing and plastic tubing are tied and cemented in place with Ambroid cement.

16. Cut out wing rib A and wing fillet members -16 through -19, carefully marking or notching attaching structure locations.

17. Using rib A to assist in alinement, cement wing fillet members to fuselage bulkheads.

18. Add ⅛ sq. strips in wing fillet members to outline the wing and fuselage intersection.

19. The entire fuselage and hatch are now planked with ¼ in. strips cut from soft 1/16 sheet balsa. See Sept. '55 issue of MAN for further details on how to plank.

20. Rudder and fin members marked X are laid out on the plans, cemented together and then located on the fuselage along with -21 vertical rudder spar.

21. Rudder ribs are cut to fit following which the entire rudder including the slot for the stabilizer is covered with Silkspan tissue and given two coats of clear nitrate dope.

22. After assembling and covering stabilizer, cut out slot in fin and rudder and cement stabilizer in place. Fairing strips cut from Art Paper are then cemented in place.

23. The wings are now assembled over the plans using a template to set rib A to the correct angle to produce 8° dihedral on the bottom of the wing.

24. After trimming wing spars to fit the fuselage intersection, the wings are cemented in place. Fairing strips between fuselage and wing leading and trailing edges are now added.

25. Main landing gear wire and plywood assemblies are cemented to rib A.

26. Cover wings and fillet area with Silkspan and apply two coats of nitrate dope.

27. The white areas along the wing and empennage LE's are next sprayed with Aero Gloss and then masked off for spraying of the entire airplane with Aero Gloss Corsair Blue.

28. The pilot's head and cockpit details are carved from balsa, painted to suit and cemented in place.

29. The cockpit canopy is heat-formed over a wooden block from .020 cellulose acetate sheet and cemented in place with Ambroid.

30. Main landing gear wheels are 2 in.

dia. air wheels which save about 1¼ oz. weight over solid wheels; however, nose wheel is solid rubber-tired to absorb the landing shocks. Attach by soldering washers to axles.

31. Cut aluminum screen wire to fit bottom opening, paint Corsair Blue and cement in place with Ambroid.

32. Wing insignia may be purchased in a hobby shop or may be made trom Trim Film decals as is necessary with the fuselage lettering and insignia.

33. The Thermal Hopper engine is installed, using 7/16 long spacer tubes and 1 in. 3-48 screws. A special screw driver made from a piece of 1/16 diameter music wire long enough to reach the screws through the tailpipe from the rear will assist you greatly in tightening the screws.

34. The metal, six-bladed fan should be made as accurately as possible, filing edges and rounding corners to eliminate drag and reduce the danger of injury while starting the engine.

35. Install the starter spring and fan and—let's go flying!

36. You will find that the Cougar has a fast glide so for Pete's sake get into some tall grass or alfalfa to do your test gliding. Trim for a right or left turn, after which you are ready for the first power flight.

I strongly recommend that this be made from a take-off rather than hand-launching by following these directions: bend the metal thrust deflector down about 10° which will keep the nose down, and then *gradually* bend it up after each attempt until the ship takes off. You can then continue until the optimum climbing angle is reached. Happy Landings!

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(*Continued from page 17*)

guide use only and step-by-step construction will not be used. This leaves much of the construction features to the builder's own choice. Wing and stab construction follow conventional methods. NACA airfoils were utilized as these have proved to give consistently good results. If at all possible, build wing in one piece and then cut in dihedral angles. Sheet the center section of the wing with 1/16 in. stock where Jetex engine pod is to be stationed. Cut pod to shape and cement into place. Then cement the veneer engine mount to pod. Screw Jetex engine mount into place and offset slightly to the right. This will maintain right thrust and insure a climbing right turn.

Fuselage is constructed of sheet balsa resulting in a light, strong and quickly-built unit. Cut the two fuselage sides at the same time for uniformity. Then cement in all crosspieces and struts. Attach the two sides and add top and bottom filler sections. Leave a space open on the bottom for the dummy. A strip of Scotch tape was used to hold dummy in place by wrapping tape around bottom of fuselage after dummy is inserted. A molded celluloid bubble was formed to shape and cemented into place. Landing gear is bent to shape and sewn and cemented to a ⅛ in. piece of veneer. Insert into fuselage at spot shown and cement firmly. Fin is then cut and sanded to shape and cemented into slot in underside of fuselage. Wing hold-downs are cut from 1/16 in. dowel or aluminum tube and inserted through fuselage and cemented. After all members have been completed, sand them smooth. Cover wing and stab with Japanese tissue. Give all parts two coats of thin dope. Sand all wood parts lightly after each coat of dope.

Before attempting any flights, assemble model completely and mount Jetex engine plus charge. Check wing, stab and fin for warps. Line-up of model should reflect even right and left wing panels and straight fin and level stab. Balance model by holding fingertips under each wing tip (CG at 40 per cent from LE of wing). Remember that dummy pilot may be shifted to achieve balance. Note: no weight should be added to nose of fuse. Model should be hand-glided and watched for excessive turn, dive or stall. Correction to be made as before in securing balance. Severe turns may be eliminated by the slight use of rudder or canting tail. If offset has been established for Jetex engine as directed previously, then model must glide in a wide left turn or a right dive will develop under power. When a fast but level glide has been established, power flight may be attempted. Start with a hand-launch, using only half a charge and later, ROG flights may be made.

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Japanese Modeling Today

(*Continued from page 13*)

similar to the cottage shops of England. One family may own a jigsaw; another, a power sander; another, a lathe. The workers make parts for model airplanes along with whatever other work they can get.

Kiri wood parts are cut by power saw, then smoothed by hand. Metal parts are formed or spun one at a time. (Because of the low labor cost, it is cheaper to have each part made by hand then it would be to have dies struck.)

About the only machine-formed parts for Eureka are the plastic canopies and accessories. Wheel hubs and tires are purchased from a factory.

These parts are delivered to another home shop where they are sorted, blueprints added, and the whole works dumped into a cardboard box.

What are the kits like? Well, bulkheads, wing ribs, formers, keels and some blocks are of kiri, which I told you was stronger than balsa but harder to work. These parts are cut out completely, then sanded and polished by hand. Fillets for the wing fairings are formed of plastic. So are air intakes, bulky nosepieces and tail tips. Landing gear is finished: wire is bent to shape. Semi-pneumatic tires are mounted on aluminum hubs. Cowlings are spun aluminum where possible. (Some planes, like the B-29, do not have round nacelles so the cowls are built up.)

For a long time, covering material was thin kiri wood sheet but lately balsa has been substituted in Eureka Kits. Although balsa does not give the excellent finish of kiri, it more than makes up for this by being far easier to work.

The huge blueprints for the multi-engine craft are extremely clear and sharp. The smaller single-engine kits usually have inferior plans; many look as if they've been through a meat grinder. The originals must have been kicked around the factory for a couple of months, with every tear, every fingerprint faithfully reproduced. When I left Japan, the blueprints were slated to be improved.

Compared with top-notch Stateside kits, Eureka models are terrific values. Yet few Japanese buy them. Reason is cost. A B-29 kit, for example, sells at a Tokyo hobby shop for over $12. Add to this the cost of cement, dope, engines, fuel and other supplies and you see that very few Japanese—who make a dollar a day—can afford one.

Eureka's main customers are the armed forces of the U.S. in Japan and Korea. But the limited market keeps down the production of any one model. Also, neither Eureka nor any other manufacturer has the facilities or resources to turn out, say, 10,000 B-29's.

Biggest bugaboo Kokubo has to face is the reduction of U.S. forces in Japan and Korea. When this comes, the market will dry up overnight. Thus Eureka doesn't dare make too many units of one plane: they can't invest in many new models and be left with hundreds of kits and no buyers.

A Solid Maker

Two modelers kept awake nights trying to figure out the opposite problem—how to fill their orders—are Osamu and Hide Iwata. From their small shop in north Tokyo, they ship exact miniatures all over the world. This all began when models made by the Iwatas won a monotonous number of first-place awards in contests. Soon they were deluged with requests to make planes for others. And from this the business has steadily expanded.

Osamu is in charge of the carving. From a block of hard wood, similar to oak, the outline shape is sawn, then carved by hand until it is virtually finished. Next, a file smooths every contour. Final polishing is done with superfine sandpaper. When the model feels like glass (remember, there is no paint or primer on it), the first of many white undercoats is sprayed on. Each is carefully sanded and rubbed until the model looks and feels like plastic. After it is thoroughly dry, Hide applies color coats. Main colors are sprayed; details and insignia are painted on by hand. This work suggests the miraculous.

I have seen intricate markings of Philippine Air Lines on a small DC-6B that from a foot away looked like the real thing. And the Pan American Airways Stratocruiser has all 48 stars on the U.S. flag painted on the tail—this at 1/100 scale!

Final polishing is done after the plane is painted. With rubbing compound the entire plane is carefully polished until it looks like metal. Finishing touches—a hand-carved propeller and spinner, hand-formed landing gear and antenna, exhaust stacks and the like—are then added.

Largest order the Iwatas have filled was for 30 Clippers for PAA (it took them six months to fulfil). Their present favorites are the new British Comet jetliner and the DC-6B for Japan Air Lines. In gleaming blue and white with striking red trim, the JAL DC-6B is a beauty.

Biggest project the Iwatas ever handled

was a giant Stratocruiser sponsored by Cemedine (a Japanese model cement manufacturer) and Pan American Airways. Under the aegis of Dallas Sherman, former PAA representative in Tokyo, plans were drawn and work started. Six months later the plane was trucked out of the shop and exhibited in a prominent Tokyo department store. It's made a tour of Japan.

Wingspan of the giant is a whopping 12 ft. and the weight is 45 lb. It took eight months to build this masterpiece and it has been exhibited for several years.

Production of Iwata solids is necessarily limited. Waiting time for an order extends beyond two months. Because it is all hand work, there is no way to speed it up. They will continue to make airplanes one at a time and buyers will continue to stand in line for some of the best solids ever built.

An Engine Maker

Engines came back on the Japanese market about seven years ago. Designs were not too good, construction and material were poor and power output was low. In fact, kit makers consistently designed smaller airplanes than usual for a given class because engines did not develop rated horsepower.

In 1949 two ardent modelers, the Enya brothers, built an engine for their own use. It proved so successful and reliable when compared with the then-available motors that friends urged them to begin manufacture. (Editor's Note: *The Japanese OS engines, perhaps others, also are well known to American builders.*)

Enya engines were an immediate success. The largest is the Model D, named the Enya .63. Top seller is the .29. Their Class A engine is the .19.

Also on the market is a new Enya, the .099. Slated for introduction are a revamped .19 and .29.

All Enya engines are either "square" or "oversquare"; i.e., the bore and stroke are the same or the bore is greater than the stroke. The head, crankcase and other parts are die-cast for Enya at a factory in western Tokyo. Assembly takes place in a workroom at their home in a picturesque village near Tokyo. Monthly production, when I was there, ranged between 1,500 and 2,000 engines, probably is higher today.

Most of these engines are shipped to America, many by American servicemen. In Japan, the Enya is low-priced, running about $5 for the .19 and .29.

Since Enya has quantity sales on the domestic Japanese market, the brothers don't have the same worry as Eureka. With the American Armed Forces departure, sales will not suffer greatly.

We must remember the Japanese modelers must do the best they can with what they have. Nevertheless, in my opinion, the products of the three firms I visited: Eureka (kits), Iwatas (solids) and Enya (engines) are on a par with top-grade American products.

These Japanese model airplanes and engines certainly need not take a back seat to any others!

Foreign Notes

(*Continued from page* 35)

Frog 149. Otherwise of conventional design, it features something new in automatic induction systems. In place of a reed-valve, designer George Fletcher has substituted a large-diameter 5-thou. shim steel disk, backed up by a coil spring. Valve is housed in a special backplate unit and incorporates a vertical intake with large volume induction chamber. On

test we obtained nearly 10 per cent better hp output over previous shaft-valve model.

Western Germany

Magnet steering soarers, which we have mentioned before in these columns, indicate a possible separate contest class in Western Germany, possibly to the Nordic A.2 formula.

Radio control news from Germany is that several manufacturers are busy working on transistorized sets.

East Germany: Controlline Championships

The new national records for ukie speed have been established in the *Deutsche Demokratische Republik*. In their Class G.2 (FAI Cl.1-.15 cu. in.), Joachim Rohr of Berlin set a new mark of 110.5 mph. Model was of all-wood construction and used a Diesel motor of unspecified type, turning a prop of unusually wide blade dimensions. In Class G.3 (jet) Arno Dobberkau of Suhl recorded 149.8 mph. Model consisted merely of a pulse-jet motor of conventional design to which a pair of metal wings were attached on the center line behind the combustion chamber and braced with steel wire, and stabilizer (with half-span elevator) on top of the tailpipe just in front of the efflux. There was no separate fuselage. The tank was contained in a metal asymmetric extension on the intake and the model had bracing wires running from the nose and tail to the inside wingtip.

These models were seen at the East German controlline championships in Leipzig, where each took first place in their respective classes with speeds of 105 mph and 134.2 mph. By virtue of these performances, Rohr and Dobberkau each won the title of *Republikmeister* for their particular class. *Republikmeister* for stunt was Werner Zorn, former 2.5 cc Class record holder. His model was of orthodox low-wing layout with full-span flaps and was powered by a side-mounted Zeiss Aktivist Diesel.

Confusion over FAI Line Thicknesses

The .15 record of 203.5 km./hr. (126.47 mph) set up by Jaroslav Koci of Czechoslovakia (see this column, 2/56 issue) has, after all, been accepted as a world record by the FAI. It appears that there is no FAI regulation regarding minimum line thickness for record attempts (which is something that needs looking into) as distinct from International contest work, and it is understood that lines of only .15 mm. thickness (.006 in.) were used by Koci, whereas British record holder Ray Gibbs used .25 mm. (.010 in.) lines in establishing his figure of 123.5 mph (FN, 4/56). Using .008 lines, Gibbs has since achieved 129.2 mph.

Hungary: Controlline Contests

A lot of attention has been given to U/C speed east of the Iron Curtain just lately. Unlike her neighbors, however, Hungary uses mainly Western motors. In the recent Hungarian National meeting at Budapest, Super-Tigre G.20 .15's took the first three places in FAI Class I, the winning model, flown by Rezso Beck achieving 103.1 mph. In Class II (.30 cu. in.) Erno Horvath used a McCoy .29 to place first with 121.1 mph, second and third going to Dooling. 29 and Super-Tigre G.21-powered models. Beck and Horvath also hold the Hungarian records with 114.9 mph (Super-Tigre .15) and 137.9 mph (McCoy .29) respectively. Two Mac .60's and a Super-Tigre G.24 occupied the first three places in Class III, winner Georgi Csefai's McCoy clocking 140.4. Georgi Benedek, noted rubber model builder, placed top in the jet class (145.5 mph) and also set a new record (using thin lines) of 160.9 mph.

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GIANT AMPHIBIOUS N.A.C.A.
"LONG PLANING HULL" FLYING BOAT
$19.95
For .45 to 1.20 Engines — 114" Wingspan (9½ Feet)
Weight with R.C. — 9½ lbs. (15.2 oz. Loading)
Radio Control— Free-Flight
The "Custom Privateer" is a huge N.A.C.A. Long Planing Hull Flying Boat design. Water take-offs with a screaming ".60" draw a crowd everytime. In seconds it is a speck in the sky, wheeling to your command. Throttle back and shoot power-on landings, taxi back to beach or boat. Test flown for two years, it has never dunked, even on white-capped open water. Standard gallon can fits under C.G. in cargo area. Design can lift several pounds of extra payload. Wing transports externally on car top racks. Easy to build, and recommended for novice R.C. flyers, as it is not critical in flight.
$4.95
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For .09 to .15 Engines — 24" Wingspan
Metal Cowl; Metal Wheel Pants; Colorful Decals
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Never before in Model Engine History has one name "TORPEDO" so predominated NATIONAL & INTERNATIONAL RECORDS

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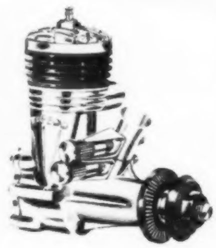
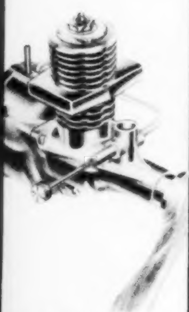
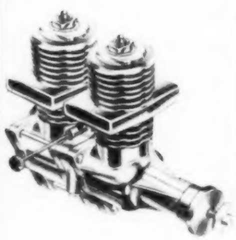
	1/2 pts.	pts.
ersonic "100"	$.50	$.80
ersonic Ultra Glo	.55	.90
ersonic "1000"	.60	1.00



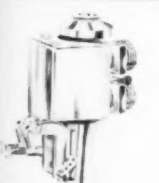
Torpedo 2 Speed
.19 - $16.95
Also available in
.15 - $11.95



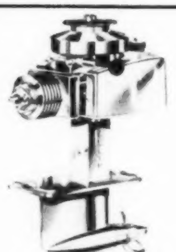
Sky Fury Single
.049 - $4.95



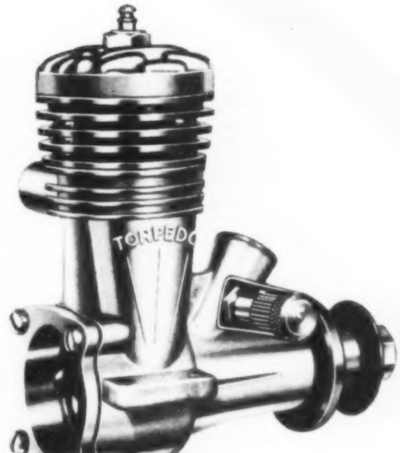
Sky Fury Twin
.099 - $9.95
.15 - $11.95



Fury Outboard Twin
$14.95 .15 - $16.95
so available in Single
.049 - $9.95



Sea Fury Inboard Single
.049 - $9.95
Also available in Twin
.12 - $14.95 .15 - $16.95



TORPEDO "15"	$10.95
TORPEDO "19"	13.95
TORPEDO "23"	13.95
TORPEDO "29"	15.95
TORPEDO "29R"	15.95
TORPEDO "35"	15.95

In the U.S.A. alone, under A.M.A. rules and sanctions, TORPEDO ENGINES currently hold (21) records—in all categories of gas model aviation.

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Allyn Craft Scale Model Plastic Boat Kits
Inboard - $4.95
Also available in Outboard - $4.95

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STREAMLINE WHEELS • SLIP ON CONNECTORS • GLOW PLUGS • SHUR STOPS
FURY LUBE • RADIAL MOUNTS • NEEDLE VALVES • ENGINE MOUNTS • SPINNERS • FURY WRENCH

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